

NILA BANTON SMITH

Be a Better Reader

BOOK

III

CANADIAN EDITION

MARION D. JENKINSON

JEAN E. ROBERTSON

PHYLLIS C. SUTHERLAND

SKILL DEVELOPMENT IN READING

Literature

History and Geography

Science

Mathematics

CURRICULUM

PRENTICE-HALL OF CANADA, LTD.

Be a Better Reader • III

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TO THE TEACHER

This book is designed (1) to improve the basic common skills needed in reading all types of material and (2) to develop special skills needed for effective reading in the areas of science, social studies, mathematics, and literature.

The unit topics were selected because of their appeal to teen-agers and because of their frequency of occurrence in junior high and high school textbooks. The skills are those most often needed in studying text and reference books at these levels. The special vocabularies include words common to the most widely used high school texts in science, social studies, and mathematics. Because of these features, this book should fit into and reinforce the curriculum of the average high school. It can be used effectively for either developmental or remedial instruction.

In the preparation of the Canadian Edition, some selections have been substituted, where applicable, in order to provide a Canadian setting. However, the philosophy of the original series as developed by Nila Banton Smith remains unchanged. The Canadian Edition has retained the developmental sequence of reading skills and the format and types of questions of the original series.

The Merriam-Webster system of pronunciation is used by permission of the publishers of *Webster's New International Dictionary*, Second Edition, copyright 1957 by G. & C. Merriam Co., publishers of the Merriam-Webster Dictionaries.

The *Teacher's Guide* which accompanies this book contains explanations of skills, page-by-page procedures, additional activities, and answers to all activities in the text.

The material in this book provides advances over Book II of the series in these respects: readability level, depth of concept, complexity of application, reintroduction and reinforcement of skills given practice in Book II, and introduction of a variety of additional skills needed in different subject fields. Book III is especially valuable for its emphasis on study aids designed to prepare students to work with the more difficult types of reading content with which they will be confronted in the years ahead. Included are exercises in outlining, organizing, making tables and diagrams, taking notes, writing summaries, preparing reports, referring to maps and diagrams, scanning for special information within a text, and locating related information outside of the text. A special feature is the wealth of material designed to improve the student's skills in pronouncing and understanding unfamiliar words.

Particular effort has been made to produce a text and *Teacher's Guide* so self-contained that they can be effectively used by a teacher without special training either in reading instruction or in subject areas apart from the teacher's own field of specialization. Selections in science, history, and social studies are complete in themselves, insofar as technical subject-information is concerned; those mathematical processes which the teacher may have forgotten are explained in the *Teacher's Guide*. A section on general procedures, complete with a report of a reading lesson, has been provided. Since many teachers report that they are using each BE A BETTER READER book with a variety of grades, a discussion of special adjustments has been made as seemed necessary for simplified scoring of the activities.

A detailed listing of the specific common skills and skills in special subjects developed by BE A BETTER READER, BOOK III, may be found in Chapter II of the background material in the *Teacher's Guide*.

TO THE STUDENT

Do you know how important it is that you BE A BETTER READER? When you stop to think about it, you find that almost everything you must learn, for school and for your life's work, must be learned by reading. If you want to do your work quickly and well, you need to learn to read quickly and well. Better reading will add to your success as a person as well as to your success in school and after. It will open doors to the pleasure of books and give you more free time for other recreations. It will make you more self-confident and relieve you of many worries about your studies and school achievement.

In the past some people thought that reading was something you learned to do as a young child and that you didn't have to bother about after that! But today, we know that no matter how well you can read now, you can always learn to read better. There seems to be no end point to how much you can improve your reading. Hundreds of thousands of adults as old or older than your parents are going back to school to learn to read better.

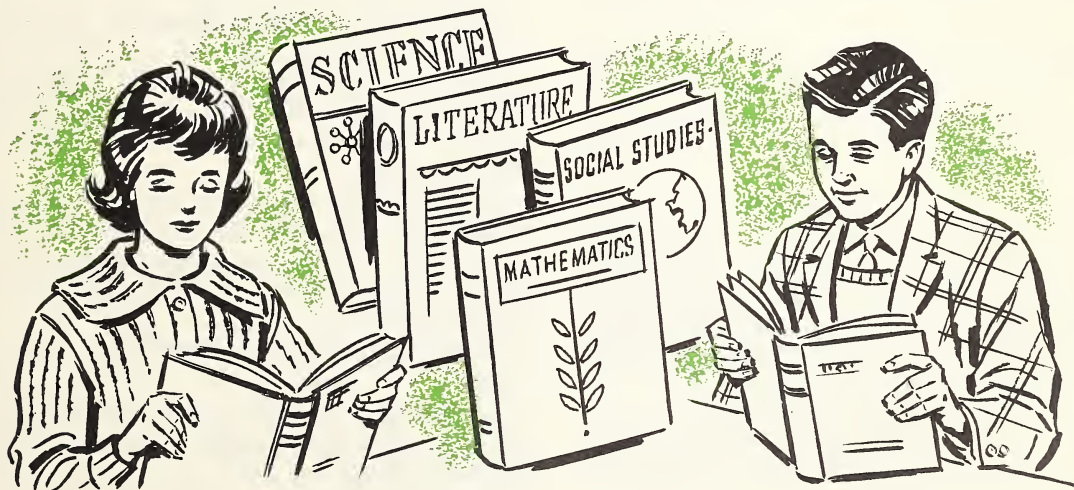
Perhaps you already know that reading isn't just one skill, like hitting a target with an arrow. Reading is made up of many skills. To improve your reading, you need to practice each one of these skills. Then, too, you need to learn how to choose and combine the different skills so that you can read a particular kind of material for a particular purpose without any waste effort. This book will give you experience in using many reading skills separately and in combination.

Like Books I and II, BE A BETTER READER, BOOK III is divided into nine units. In each of these units you

will find an exciting story, a social studies selection, a science selection, and a mathematics selection. By learning and applying the special skills practiced in each of these subjects, you will find your regular work in literature, science, social studies, and mathematics easier and more accurate. Each unit also gives you experience in the *basic* skills that you can use in all your reading. Some of your practice will improve skills that you have already started to develop in previous years. Some will introduce new skills that you need to use with the more difficult work ahead.

You will find that BE A BETTER READER, BOOK III has been planned to give you special help with the problem of new words which you will meet in your reading. If you use these helps carefully, you will be able to pronounce and understand such words much more easily than most students do at your grade level. You will also be given a great deal of valuable practice in grasping the organization and details of more difficult reading material such as you find in your science and social studies texts. Reading critically, using illustrations and diagrams, reading rapidly, and planning how to read certain kinds of content are other features given special emphasis in this book.

You can read just as well as you want to. Set your own standards, then start at once to achieve them. When you study each of your different school subjects, make use of the helps given you in this book. These techniques will help you complete your assignments faster and with better results.



UNIT ONE

MOON TRAVEL



Toby and Sarah, the teen-agers in this science fiction story, had an exciting adventure while living on the moon. Do you think that you might like to live on the moon? Perhaps you will be able to answer this question more definitely after you read the story and the selections in this unit.

Before you begin, study the word helps at the bottom of the page. Do this with any page that offers word helps.

THE MOON RIDDLE *

The summer of 1987 found the Thurstons vacationing a quarter of a million miles from home. They were renting an underground hut on the moon. Mrs. Thurston, Toby, and Sarah had come here to visit Mr. Thurston, who was holding a post on the earth's satellite as an engineer.

Living on the moon had been an exciting adventure until trouble struck during the long two-week night.

Toby and Sarah were watching movies in their game room when Toby remarked, "Sarah, I'm getting cold!"

His sister shivered. "I am, too! You'd better check." Sarah was thirteen, a year younger than her brother.

Toby met Mom in the hall and saw the fear in her eyes.

"Toby, a big crack has just split the kitchen wall from roof to floor!" she burst out.

Dread seized Toby's heart. Because of the moon's absence of air—and sunlight, too, at this particular time—the temperature outside was over a hundred degrees below zero. Before long the house would be totally without oxygen and unbearably cold.

"I'll send for help!" Toby said and raced off.

He tried to use the radio-phone. But the set was dead! He tinkered with it for several minutes but could not locate the trouble.

* Adapted from a story prepared for this book by Richard Elam.

"What'll we do, Mom?" he asked desperately. His mother and Sarah were hanging over his shoulder.

"You and Sarah must look for your father. You remember he said he'd be in the neighborhood searching with the other engineers for a spot on which to build a water station."

"But what about you, Mom?" Sarah protested. "Your space suit is being fixed. You can't stay here!"

"I can survive if you locate Dad before too long," her mother assured her.

They had to act quickly, carrying all the spare oxygen tanks and blankets into one of the larger closets.

"Don't you two worry about me," Mrs. Thurston said, with a brave smile. "I'll seal the door with some of these blankets and wrap up in the others. Just don't lag, please!"

Toby and Sarah left her to don their space suits. Calling a quick good-by, they hurried up the steps to ground level. The sky was ablaze with starlight, and green earthshine flooded the distant sawtooth hills and gaping craters.

"Which way shall we go, Toby?" Sarah asked anxiously.

"I remember Dad saying something about visiting the 'peg-leg hermit of the hills,'" Toby said, "whatever he meant by that."

Sarah looked baffled. "I can't imagine who *that* could be!"

"The only hills around here are over that way," Toby

engineer (ĕn'jĭ nĕr'): One who is skilled in some mechanical field or in construction.

survive (sĕr vĭv'): To live.

despairingly (dĕ spā'ring lĭ): Giving up all hope.

stricken (strĭk'ĕn): Disabled.

baffled (băf'ld): Confused, bewildered.

treacherous (trĕch'ĕr ũs): Unstable, dangerous.

meteoric (mĕ'tĕ ōr'ĭk): Having to do with a meteor.

frantically (frăn'tĭ kăl ĭ): Wildly, desperately.

rubble (rŭb'l): A mass of rough, broken stones.

pointed out. "So whoever or whatever the hermit is must be in that neighborhood. Let's go."

They started out, taking great leaps in order to travel faster. They were able to leap because they weighed only one sixth of their earth weight.

As they bounded along, they were watchful of treacherous chasms and pits lurking in the inky shadows. Searchlights on their helmets helped them avoid these perils and also lighted the way. Reaching the hills Toby warned Sarah to stay within the suit-radio range, and they began to search separately. They trudged through meteoric dust, exploring frantically here and there for some sign of their father's party—a tractor tread, a footprint, anything. . . .

But the precious minutes passed with neither of them finding a trace of their father. They joined forces again, having wasted a half hour in vain seeking.

"Poor Mom!" Sarah sobbed. "The time is running out, Toby! She can't live!"

"I know," Toby murmured despairingly. "If we could only figure out what Dad meant by the 'peg-leg hermit of the hills.' I'm usually pretty good at riddles, but this one stumps me!"

Toby scanned the knife-edged peaks and gnarled crags, which rose like stone sentinels around them.

Then he suddenly spotted something that sent his blood racing with hope.

"Sarah—that rock formation over there!" he said excitedly. "If you use your imagination it looks just like a giant with a wooden leg!"

"The peg-leg hermit!" Sarah exclaimed. "That must be the hermit."

They scrambled through the rubble and thick dust at the foot of the hills, toward the curious tower of rock. Then they walked along a path between the "legs" of the natural statue and found themselves going downgrade. At the bottom of the slope they made several turns and then Sarah squealed for joy.

"There they are, Toby—Dad's party!"

A few moments later the two were pouring out their story to their father. No time was lost in returning to the stricken home in the engineers' swift moon tractors. They found Mrs. Thurston blue with cold and on her last tank of oxygen. But help had luckily arrived in time. The crack in the wall was quickly mended, and Mrs. Thurston was soon comfortable again.

"From now on," Toby said jokingly afterward, "I'm making riddles my hobby. Then if we get in trouble again, maybe it won't take me so long to figure it out!"

COMPREHENSION QUESTIONS

See how well you understood this story. Answer these questions in as few words as possible.

- 1. How did Toby and Sarah happen to be on the moon?

- 2. What happened one day while they were watching movies?

- 3. What effect would this accident have on the inside of the house?

- 4. What was Mr. Thurston looking for, at the time of the accident?

- 5. Why didn't Mrs. Thurston put on her space suit?

- 6. What did the children get for their mother before they left?

- 7. Why could Toby and Sarah leap along?

- 8. What were they trying to figure out?

- 9. What did they see that told them where Mr. Thurston was working?

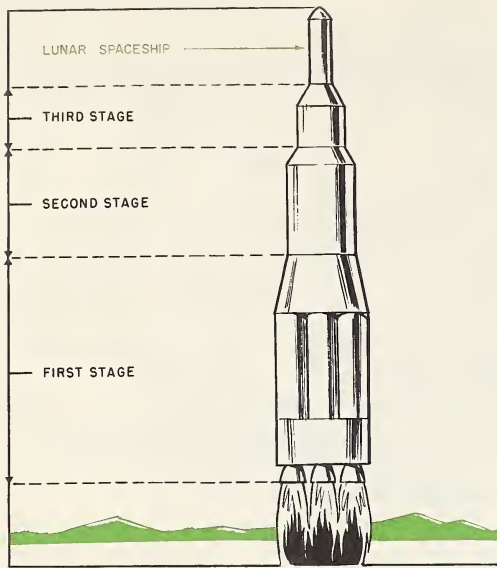
- 10. How did they travel back to their underground home?

DISCUSSION QUESTIONS

You have been writing about things that the story told you directly, in "so many words." In order to get the most enjoyment out of a story, however, you need to live through the experiences of the people in the story and try to feel as they felt in different situations. Answer the questions below on a separate piece of paper. Then discuss them with your teacher and classmates.

- 1. The story said that Mr. Thurston was "holding a post." What does "holding a post" mean? For whom do you think he was holding the post?
- 2. How do you think Sarah felt when her mother said there was a big crack in the kitchen wall? Would you feel the same way if your mother discovered a crack in the kitchen wall of your home? Why?
- 3. What was the general tone of this story? Was it one of happiness? Sadness? Worry?

REACHING FOR THE MOON



This is a diagram of a three-stage rocket.

When do you think you will be able to spend your summer vacation on the moon like the people in the story? Make an estimate after reading the selection that follows.

Follow this procedure in reading the selection:

1. Study the diagram of the three-stage rocket. Read the boldface headings to find what the different stages of development are. Then do Activity 1.

2. Read carefully the content under each boldface heading for the purpose of finding out what important events took place under this heading. Think how each event led to the next, and figure out the number of years between each two events.

3. Do Activities 2 and 3.

HISTORY OF SPACE ROCKETS

Man has dreamed about space travel throughout the ages. It is only during the last four decades, however, that he has given serious thought to reaching the planets and our moon. The rapid development of space rockets during this period has renewed his hope and pointed the way to making his dream come true.

PRINTED THOUGHTS CAME FIRST

The first printed thoughts on scientific methods of sending a rocket into space appeared in 1920. The article, written by Professor Robert H. Goddard, was called "A Method of Reaching Extreme Altitudes."

A book on rockets appeared in 1923. This book was called *The Rocket into Interplanetary Space*. It was written by a German professor whose name was Hermann Oberth. Six years later the third edition of this book was published under the title *Ways to Space Travel*. These two books by Professor Oberth contained the actual plans for building space rockets.

A Frenchman by the name of M. Esnault-Pelterie published a classic book on rockets in 1930.

EARLY EXPERIMENTS WITH ROCKETS

In 1926 Professor Goddard built the first liquid-fuel rocket. The rocket was light enough to be carried in one hand. It was the first rocket that flew under the liquid-fuel power created by burning liquid oxygen and alcohol, gasoline, or other materials.

By 1931 several successful liquid-fuel rockets had been built. The heaviest of these rockets weighed about 35 pounds. The highest altitude which any of them reached was about 3,000 feet.

In 1936 Professor Goddard made a rocket that shot to a height of 7,500 feet. This rocket weighed about 85 pounds at take-off. German inventors had been busy building rockets also. They had, at this time, made a heavier rocket similar to Goddard's rocket, but the German rocket didn't rise as high as the Goddard rocket did.

During the next five years, great advances were made in weight of rockets and altitudes reached. By 1941, German engineers had created rockets with a take-off weight of 1,000 pounds. They had shot these heavier rockets to a height of several miles.

RECENT DEVELOPMENTS

All of the rockets that you have read about so far were single-stage rockets. They were rockets with just one motor or set of motors drawing on a single source of fuel. By 1946, the single-stage rocket had become so advanced that earlier types might be compared with Fulton's first steamboat or the Wright brother's first airplane. On December 14 of that year, at White Sands Proving Ground in New Mexico, the United States sent a captured German single-stage rocket 114 miles above the earth. This rocket was of

Hermann Oberth (ô'bûrth): Author of a book on rockets.
satellite (săt'ē lit): A body revolving around a larger body in space.

orbital (ôr bī tāl): Pertaining to the path of one body revolving around another, as the earth around the sun.
interplanetary (in'tēr plăn'ê tēr i): Between planets.

a type called V-2. It weighed 12.5 tons. It travelled at a top speed of one mile per second. It burned 275 pounds of fuel during each second that its motor operated.

In 1949, the United States sent the first two-stage rocket to an altitude of 250 miles. A two-stage rocket consists of two rockets, a first-stage rocket and a second-stage rocket. When the first-stage rocket reaches top speed, it shoots out the second-stage rocket. This second-stage rocket continues in flight, while the first stage drops back to earth. The first stage of this original two-stage rocket was a V-2 and the second stage was an American-built rocket called the *WAC Corporal*.

In 1957, the new *multistage* rocket opened the Age of Space by putting the first satellite into orbit around the earth. The multistage rocket has three or more stages. Each successive stage fires when the one before it reaches top speed. The final stage of a multistage rocket travels at speeds ranging from 18,000 to 25,000 miles per hour. It can carry instruments weighing several tons. Multistage rockets have launched dozens of earth satellites, reached the moon, flown millions of miles into space.

In 1961, just 41 years after the first scientific article proposing space flight, man accomplished the dream of centuries by entering space. A Russian, Yuri Gagarin, had the honor of being the first man into space. Commander Shepard of the United States made a space flight later in 1961.

THE FUTURE OF ROCKETS

Many scientists expect the next major rocketry development to be the construction of permanent launching bases on the moon. The moon has no air to interfere with astronomy or to create resistance to rockets in flight. The moon's weak gravity will multiply by six the power of rocket engines at take-off.

The atomic engine will probably follow. An atomic rocket will heat fuel, rather than burn it. Such a rocket will produce a jet of hot gases. It will be two or three times as efficient as present rocket motors. It will increase speed and range so that man can begin exploring the other planets of our solar system.

The electric rocket may be the next development. Once launched by liquid or atomic fuel, the electric rocket will be able to cruise through space for months or years, carrying man to the ends of the universe.

ACTIVITY 1—STATING BOLDFACE HEADINGS

Write the name of each of the periods of rocket development. Do not refer to the article.

- I. _____
- II. _____
- III. _____
- IV. _____

ACTIVITY 2—STATING IMPORTANT EVENTS

Write the important events that happened during each of the first three periods, and those that may happen during the fourth period. Give a date if the selection does.

First Period

- 1. _____
- 2. _____
- 3. _____
- 4. _____

Second Period

- 1. _____
- 2. _____
- 3. _____
- 4. _____

Third Period

- 1. _____
- 2. _____
- 3. _____
- 4. _____

Fourth Period

- 1. _____
- 2. _____
- 3. _____

ACTIVITY 3—MAKING A TIME LINE

Ask your teacher to show you how to make a time line showing dates of important rocket events.



MAN ON THE MOON

"The Moon Riddle" is probably not the only story you have read about human beings making a trip to the moon. Many stories and articles are being written on this topic. Several problems must be solved, however, to allow man to live on the moon. The selection below discusses some of these.

This is a *problem-solving* selection. It describes problems and tells about possible solutions to these problems. It is similar to material which you often find in your *science* books.

In reading *science* a boldface or italic heading often gives you a cue as to a problem that is to be discussed. Getting the problems clearly in mind is the first step to take in studying *science* material of this kind. You will be asked to do this below.

PROBLEMS OF LIVING ON THE MOON

LACK OF AIR

In the selection that you have just read, you learned that the moon's lack of air, along with the moon's lack of gravity, makes the moon a good base for interplanetary exploration. From telescopes on the airless moon, man can get his first clear look at the universe. From launching pads on the airless moon, man can send rockets six times as far as they can be sent from the earth. These rockets can be circular, square, or many-angled, depending on the best shapes for their purposes. The moon has no atmosphere to create air resistance and friction.

Many men must live continuously on the moon if we are to get all of these benefits. Studying the stars through telescopes on the moon is a job of many years. Then, too, special rockets must be put together there, since with their strange shapes they can't be launched and flown from the earth. Other rockets coming from the earth must get more fuel on the moon in order to profit fully from the extra power of a moon-launching.

A large number of men are needed to do all these things. There must be scientists and engineers to study the stars and to work on rockets. There must be construction workers. There must be people to do such work as cooking and cleaning, so necessary in keeping the others fit. Only a moon-city can give man the full benefits of the moon's great natural resource, lack of air.

Building such a city to take advantage of the moon's lack of air creates a serious problem, however. With-

1. Read all of the boldface headings. See if you can get a clear idea of what the problems of living on the moon are by reading only the headings.

2. Next read the selection all the way through, carefully. Each time you come to a boldface heading that names a problem, read the paragraphs under that heading to find out: (a) more information about the problem; (b) how the problem may be solved by scientists.

out air to breathe, man himself cannot live. There are two ways in which scientists can meet this problem.

The first method of supplying air to the moon-dwellers is that of sending containers of oxygen from the earth on the flight to the moon. Just as in atomic submarines, the men on the moon can keep the oxygen clean with chemicals and use it over and over again.

The second solution to the problem is making air on the moon. Rocks are made up of many different chemical elements. By working on the rocks that make up the moon, perhaps scientists can take out the elements needed to make air.

EXTREME TEMPERATURES

The earth is surrounded with a blanket of atmosphere which protects it somewhat from the heat of the sun. This is not true of the moon. The hot sun shines directly on the rocks for 14 days at a time. The temperature during this time is more than 200° F., a heat about twice as great as any heat we know at the hottest time of the year on this continent. During the next 14 days the temperature is extremely cold. In spots the extreme lower temperature may drop to some degrees below -400° F. We think the temperature is very cold in our country when it is -20° F., or "twenty degrees below zero" as we say.

The space suit is one solution to this problem. Such suits can supply heat or coolness, as well as oxygen, to men outdoors on the moon.

hydroponics (hī'drō pŏn'iks): Farming in water and chemicals.
continuously (kŏn tīn'ū ūs lī): Going on without a break.
container (kŏn tăn'ēr): A box, carton, or tank used in packing.

concentrated (kŏn'sĕn trāt'ĕd): Increased in strength by removal of water or waste.
protection (prŏ tĕk'shŭn): Act of guarding or shielding.

To supply comfortable homes for men living on the moon, underground huts with heat and air-conditioning can be built. The Thurstons of the story lived in such a hut. Another solution is the dome of plastic. Such domes can be held up by the pressure of air inside them. Two or three thicknesses of plastic with air between them can give protection against heat and cold just as do storm windows. Various gases can be used between layers to give shade or light.

LACK OF WATER

There is no water on the moon. This is a major problem because men need water not only for drinking and bathing but also for use in temperature controlling systems and for running many kinds of machines. Water will have to be supplied for these purposes.

As one solution to this problem, water may be brought from the earth. The use of chemicals will make it possible for the men to use the water over and over again. Another solution is the manufacture of

water on the moon itself. The hydrogen and oxygen that make up water can be taken from rocks and chemically combined.

LACK OF FOOD

Since the moon lacks water, it lacks native plants and animals that men can eat.

Food brought from the earth is one solution to this problem. When concentrated, a great deal of food can be stored in the small space inside rocket ships. Another solution is the use of *hydroponics* to grow food on the moon. Hydroponics is the science of growing plants in chemicals dissolved in water. If the air, water, and chemicals needed for plant growth can be taken from rocks, scientists would be able to “farm” beneath the domes of the moon-city.

Perhaps someday you, yourself, will see the shining domes of the City of the Moon rising hundreds of feet above you.

Would you like to see such a sight as that?

ACTIVITY 1—LISTING PROBLEMS AND THEIR SOLUTIONS

Right after the four numbers, list the problems of living on the moon. On the lines following and be-

low each problem, write one, two, or three solutions, according to the number given in the selection.

1. _____

2. _____

3. _____

4. _____

ACTIVITY 2—REASONING QUESTIONS

Write your answers:

1. Could you light a fire on the moon? _____
Why or why not? _____
2. Could you hear sounds on the moon? _____
Why or why not? _____

Applying What You Have Learned About Studying in Your Science Books

When studying in *science*, try to find out whether the chapter or part of the chapter which you are reading deals with problems. If so, do these things:

1. Get the problems clearly in mind. Reading the boldface or italicized headings before you read the text should help you do this.

2. Read the material under each boldface heading

to find out: (a) more information about the problem; (b) how it was solved.

Remember, however, that this plan of study applies only to parts of your *science* books that deal with problems. When you are studying other patterns of *science* writing, you should use other procedures that will be discussed in this book.

TIME, DISTANCE, AND SIZE

When reading about space travel we often find that numbers are mentioned. Working problems with these numbers helps us to get deeper meanings and insights than we might otherwise get.

The problems below have to do with the moon and with the planets—time, distance, and size.



The Sun and Its Family

Different Reading Skills Are Needed in Mathematics

Many students have difficulty with *mathematics* because they don't know how to *read* mathematics. You should read *mathematics* differently from literature, social studies, science, and other subjects.

First of all in reading *mathematics*, you must be prepared to take the time to be *exact*. It makes a difference whether a number is 100.1 or 1001. Look carefully enough to be sure of each figure. If, for example, you're asked to find the *abscissa*, and you don't know what it is, find out. Be sure, too, that you know the meanings not only of the special mathematical terms but of the special mathematical abbreviations and symbols. And, of course, if there is any question at all about your knowledge of the multiplication table or simple addition and subtraction, set aside a daily period for review right now and keep on reviewing until you know these things perfectly.

Next, take the time to be *orderly*. When a new topic or process is introduced, read and reread the explanation until you understand it. If you're in doubt, look away from the page and try repeating the explanation to yourself. Be sure you take advantage of the sample problems, diagrams, charts, and other illustrative material provided for you. Don't try to work the problems until you know exactly how to proceed. Then work slowly and carefully, step by step, until you are sure you have the procedure exactly right.

Once you do know the procedure, start working for *flexibility* and *speed*. Be prepared to move your eyes up or down on the page as often as you move them from left to right. Once you have read a problem straight through and know that you understand it, you should be able quickly to pick out the sentence that asks or tells you to find something, glance at the lines of print to select the numbers that you need, look back at the preceding page to choose a formula if necessary.

The mathematics selections in this book have been planned to help you develop, maintain, and increase all of these mathematical *reading* skills. Many of the

early selections are concerned with arithmetic problems because such problems will give you the greatest variety of mathematical reading experience. If you are already studying algebra, geometry, or other advanced mathematical subjects, you should find that the exactness, order, flexibility, and speed that you develop with the use of this book will carry over.

In reading a mathematics problem, you must be able to decide upon several things before you compute the problem on paper:

1. What you are supposed to find.
2. What facts you are given to work with.
3. What process or processes you need to use.
4. What estimate you can make of the answer.

After doing all of these things in which you use reading, thinking, and analyzing processes, you are ready to compute the problem. The additional processes then are:

5. Setting the figures on paper and making your computation.
6. Comparing your answer with your estimate.
7. Checking your answer.

If you are having difficulty with mathematics, you need to spend a lot of time reading, rereading, and thinking about each problem before you try to compute it. Probably 80 or 90 per cent of your time should be devoted to reading, thinking, and analyzing, and perhaps 10 to 20 per cent in actually working with figures on paper.

A student who is good at mathematics won't need to reread so much as a student who has trouble in this subject field. If you are one of these fortunate students, you may use the exercises that follow, on these and later pages, to develop greater flexibility and speed. See how rapidly you can answer the questions and compute the problems without making a single mistake. If you are a student who has trouble with problems, however, don't try to work for speed until you find that you are giving the right answer to each of the questions asked on the problem pages.

Problems About the Planets *

In this first lesson you will be given practice only on Step 1.

1. Read each of the problems below all the way through very carefully. Think about the meaning of each sentence and try to grasp the problem as a whole.

2. Glance through the problem again until you

find the sentence that asks you a question. Read this sentence again *very carefully*, and decide what it is that you are asked to find. Then answer the question under the problem. Don't just copy the question as it is stated in the problem. Tell in your own words what you think you are supposed to find.

Ask your teacher to give you additional problems.

1. How many times per year of 365 days does the moon revolve around the earth, if each revolution takes 29 days?

What are you to find? _____

For how many years could that energy heat a home using 12 tons of coal per year on the average?

a. What are you to find? _____

2. The amount of energy which the earth receives from the sun in 1 second is estimated to be equal to the energy released by burning 600,000 tons of coal.

b. What number do you *not* need? _____

SOME FACTS ABOUT THE SOLAR SYSTEM

<i>Planets</i>	<i>Approximate distance from sun in miles</i>	<i>Diameter in miles</i>	<i>Approximate time for one revolution around the sun</i>
Mercury	36,000,000	3,009	88 days
Venus	67,000,000	7,575	225 "
Earth	93,000,000	7,918	365 "
Mars	141,000,000	4,216	687 "
Jupiter	483,000,000	86,728	12 years
Saturn	886,000,000	72,430	29.5 "
Uranus	1,782,000,000	30,878	84 "
Neptune	2,793,000,000	32,932	165 "
Pluto	3,680,000,000	?	249 "

Use facts from this table to solve the following problems.

3. What is the approximate distance of the earth from each of the other planets, including Pluto?

a. What are you to find? _____

4. Which is closer to the earth, Mercury or Mars? How much closer?

What two things are you asked to find?

a. _____

- b. How many computations will you need to make? _____

b. _____

Applying What You Have Learned About Reading Problems

Whenever you start work with a new problem, whether it is in an *arithmetic*, *algebra*, or *geometry* book, always do these things first:

1. Read the entire problem to grasp it as a whole.

2. Read again the sentence that asks you or tells you to do something. Make sure that you know what it is that this sentence asks you or tells you to do before you start working out the problem.

* Based on problems prepared for this book by Donald W. Lentz.

PRONOUNCING AND UNDERSTANDING UNFAMILIAR WORDS

Mastery of the abilities needed in pronouncing new words correctly and in understanding their meanings is of basic importance in studying high school textbooks.

The methods which you previously have been taught to use in working out pronunciations are: sounding letters or word elements; getting the word from context; using structural analysis (breaking the word into parts—root, prefix, suffix, syllables); and using the dictionary. All of these techniques will be reviewed in this book.

In your first review you will work with the word structure technique in which you add prefixes or suffixes to root words and check the changes in meaning resulting from these additions by supplying the words in context.

Write each of the prefixes below on the line to the left of one of the words. Then write the word you have made in the blank space in one of the sentences. You will need to add s, d, or ed to some of the words when you write them in the sentences.

mis	un	trans	re	dis	de	multi	semi
-----	----	-------	----	-----	----	-------	------

_____turn	_____color	_____cover	_____take
_____scribe	_____print	_____darkness	_____comfortable

1. Toby found some beautiful rocks on the moon.

The rocks were _____.

2. Do you think that Mrs. Thurston would ever want

to _____ to the moon?

3. Mr. Thurston dictated his findings to Mrs. Thurston. She took them down in shorthand. Then she

_____ them.

4. It is hoped that scientists will _____

some way of providing spacemen with oxygen other than carrying tanks on their backs.

5. An article in a newspaper stated that the climate on

the moon was comfortable. This statement was a

_____. The word that should

have been used is _____.

6. The explorers on the moon worked a part of the time in _____.

Work with the suffixes, words, and sentences below in the same way that you worked with prefixes. You will of course add the suffixes to the ends of the words. Drop a final y or e when you need to in writing a suffixed word in a sentence.

ist	less	en	ness	ful	ion	ment	ation
-----	------	----	------	-----	-----	------	-------

event_____	protect_____	botany_____	swift_____
develop_____	form_____	water_____	short_____

1. Toby saw a rock _____ that looked like a one-legged man.

2. Rockets have undergone rapid _____.

3. Space travellers must have _____ from extreme heat and cold.

4. The moon is a barren, _____ satellite.

5. Since there are no plants on the moon, do you think a _____ would want to explore this satellite?

6. The _____ with which a rocket can fly is almost unbelievable.

7. Some people think it will be thirty years before men explore the moon. Do you think scientists may _____ this time?

8. It will be an _____ day when the first man lands on the moon.

9. Scientists must discover some solution to supplying the liquids the human body must have if people are to stay on the _____ moon.

IDENTIFYING VOWELS AND CONSONANTS

When you come to a word in your reading which you can't pronounce, what do you do? Quickly call it something whether or not you are right, and go on? Skip the word? Ask someone to tell you what it is? Try to work out the pronunciation by yourself? Look it up in the dictionary?

If you are doing any of the first three things you need to break yourself of the habit and begin at once to use surer ways of finding out how to pronounce new words.

The dictionary gives you help in pronouncing all words. It can be used when you are in doubt. It takes time, however, to look up every new and difficult word that you meet in your reading. You should be able to work out the pronunciation of many words by yourself. To do this you need to review pronunciation aids. For this reason, a review of pronuncia-

tion helps is offered in this book quite frequently.

You probably have worked with vowels and consonants for several years. Recognizing these two kinds of letters is of such basic importance, however, that they will be reviewed first of all.

The vowels, as you know, are a, e, i, o, u, and sometimes y. When you come to a word that gives you trouble, you should be able to identify quickly the sounded vowel in each part of it.

The consonants, as you will recall, are b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, z, and sometimes y. It is equally important that you should be able instantly to recognize the consonants in different parts of difficult words.

Time yourself in doing the work below. See how quickly you can identify vowels and consonants in different positions in words.

Beginning time: Hr. ____ Min. ____ Sec. ____

Identifying Vowels

Underline one word in each group in which a vowel comes at the end of a word.

zero vacation absent	station murmur estimate	sentinel actual Mexico	algebra liquid condition
------------------------------	---------------------------------	--------------------------------	----------------------------------

Underline one word in each group in which a vowel comes at the beginning of a word.

atmosphere represent discuss	instrument material cushion	survive process orbital	dangerous article crater
--------------------------------------	-------------------------------------	---------------------------------	----------------------------------

Underline one word in each group in which a vowel comes in the middle of a word.

problem supply chasm	stump control compute	practice rocket check	don rapid total
------------------------------	-------------------------------	-------------------------------	-------------------------

Identifying Consonants

Underline one word in each group in which a consonant comes at the end of a word.

radio helmet distance	locate describe baffled	person purpose altitude	alfalfa space important
-------------------------------	---------------------------------	---------------------------------	---------------------------------

Underline one word in each group in which a consonant comes at the beginning of a word.

apply earth several	pattern astronomer extreme	army opposite telescope	except distance appear
-----------------------------	------------------------------------	---------------------------------	--------------------------------

Underline one word in each group in which one consonant comes in the middle of a word.

question revolve vivid	energy planet grasp	stage stricken water	able crack below
--------------------------------	-----------------------------	------------------------------	--------------------------

Ending time: Hr. ____ Min. ____ Sec. ____

Subtract your beginning time from your ending time and see how much time it took you to do this work.

REVIEWING LONG AND SHORT VOWEL SOUNDS

You will recall that the most common sounds of vowels are the long sounds and the short sounds. The long sounds are marked with a short bar like this: ā. This bar is called a *macron*. Short sounds are

marked with a curved line like this: ă. This curved line is called a *breve*.

For review purposes a table for long and short vowel sounds is given below.

Long Sounds

1. ā as in āte
2. ē as in bē
3. ī as in like
4. ō as in rōse
5. ū as in mūle
6. y as in cry (usually re-spelled with long i, as in crī)
7. y as in baby (In Canada the y is often spelled as a long ē)

Short Sounds

8. ȡ as in fȡd
9. ă as in ăt
10. ě as in běd
11. ĭ as in sĭt
12. ȣ as in hȣt
13. ŭ as in cŭt
14. y as in myth (sometimes as ĭ)
15. ȡ as in gȡd

Recognizing Vowel Sounds

Decide whether the sounded vowel in each of the words below is long or short. If the sounded vowel in a word is long, write the word under the heading "Words with Long Vowels" and mark the sounded vowel with a macron. If the sounded vowel is short,

write the word under the heading "Words with Short Vowels" and place a breve above the sounded vowel. Respell y as i if necessary. Cross out silent vowels. All of these words are in Unit Two. You will meet them again when reading that unit.

fond
tube
act

role
dry
breve

deft
lungs
drift

sign
waste
dig

Words with Long Vowels

Words with Short Vowels

Marking Long and Short Vowel Sounds

Below are words containing long or short sounds of vowels. Decide upon the sound of each vowel. Refer to the table on this page for the number of

that sound. Write the number in the space to the left of the word. Then mark the vowel in the word. Respell y as i if necessary. Cancel silent vowels.

_____dive

_____scan

_____stretch

_____tools

_____plot

_____rate

_____grasp

_____might

_____film

_____stood

_____loom

_____hold

_____flesh

_____dye

_____huge

_____fine

_____bulb

_____sack

_____lane

_____Steve

_____blaze

_____grip

_____wise

_____bomb

_____crack

_____date

_____fond

_____fact

_____clack

_____line

_____lid

_____those

_____brick

_____dust

_____still

_____wood

_____name

_____act

_____sham

_____loose

_____own

_____place

_____stoop

_____crane

REVIEWING ADDITIONAL VOWEL SOUNDS *

You have been using pronunciation keys in dictionaries for several years. But are you *sure* that you recognize the exact sound of each of the vowels as marked in a dictionary key? Or are you apt most often to pronounce a new word as if the vowel sounds are either long or short regardless of markings for other sounds?

Review the vowel sounds below, and see how well you can tell the differences among them.

Notice particularly the sound of a vowel when followed by r. The r changes the sound to one that is neither long nor short; as, ä in färm, and â in câre. The r usually gives a the sound that it has in färm when there is no other vowel in the word or syllable. It usually gives a the sound that it has in câre when there is a silent vowel in the word or syllable; as, fâre, âir, beâr.

The vowel e has three different sounds when followed by r. Two of these are ê in hêre and ē in makêr. One-syllable words having an e sound slightly stronger than that of the ê in makêr are usually respelled with û in the dictionary; as per (pûr).

The sound of i is changed by r, but there is no special marking for this sound. Words or syllables containing i followed by r are respelled in the dictionary with û; as, bird (bûrd).

The vowels o and u have a special mark when their sounds are changed by r, as in côrd, cûr.

The most common sounds are the long and short sounds, and sounds influenced by r. There are several other sounds, however. There is the very short sound of â, as in bâsket, which is indicated with a dot above the a. The vowels a, e, o, and u have a shortened long sound which usually appears in an unaccented syllable. This sound is indicated by a macron with a short perpendicular bar; as, â, ê, ô, û. Examples of words containing these sounds are châ-otic, êrect, tômato, ûnite. This sound of u very rarely occurs.

The vowels a, e, i, o, and u all have a soft, short sound which is like a very soft, short u regardless of which of the vowels is used. This sound, called the *schwa* sound, always occurs in an unaccented syllable.

In Webster's dictionary the vowel having this sound is always printed in italics. It is marked with a breve except in the case of â, where it is marked with the dot. Examples of words with a schwa sound are diphtheriâ, âhead, dilligênt, policy, côrrect, chorûs.

The following table includes most of the vowel sounds. Study it for a few minutes, then mark the words below the table. You know how to pronounce all of these words. Mark them to show that you recognize the differences among the different sounds. Refer to the table if you like. Cross out silent vowels. Respell words if necessary. Underscore letters to indicate italics if the letters have the schwa sound.

KEY TO PRONUNCIATION OF VOWELS

â as in âte
â as in vâcation
â as in câre
ä as in âm
ä as in âccount
ä as in ärm
â as in âsk
â as in âbound

ê as in êve
ê as in hêre
ê as in êvent
ê as in ênd
ê as in silênt
ê as in makêr
e as in per: pûr
silent e with le, ble, etc.,
as in able: abT

î as in îce
î as in îll
î as in Aprîl
î as in bird: bûrd
ô as in ôdd
ô as in sôft
ô as in cônnect
oi as in oil
ou as in out

ôo as in fôod
ôo as in fôot
û as in cube
û as in ûnite
û as in ûrn
û as in ûp
û as in circûs
y as in cry (crî)
y as in baby (babî)

unit
struck
surge
room
shark
giant
support
tobacco
express
producer
possible

travel
trip
impact
tank
short
perhaps
churn
shoot
result
radar
moment

orbit
dance
discuss
matter
closer
suffix
flood
high
affix
bacteria
depend

crack
mask
told
danger
midst
first
shot
know
melon
resent
stockade

* The diacritical markings shown on this page are the ones used in *Webster's International Dictionary*.

A GENERAL PLAN FOR STUDYING

A Plan for Working

Making a time budget is one of the first steps to take in planning for successful home study. Work out one time budget for evenings and another for weekends. Set aside time to view television or to engage in other forms of recreation. Also set aside definite periods of time for study. Then make sure that you live up to your budget and that you give your study the full

amount of time allotted to it. This is very important.

When study time comes, go to your own room where it is quiet. Don't try to study in the living room with television running or people talking. When you get inside your room, start studying at once. Don't put it off while you think about other things. Settle down to business immediately.

A Plan for Reading

Whether you are working at home or at school, decide upon a plan for studying a new chapter before you tackle it. The general plan below often proves helpful when working with material in which facts must be understood and recalled. You wouldn't use this plan in reading *literature* or *easy narrative material*. You would modify it frequently even when studying factual material for different purposes. Basically, however, this procedure with some adjustments can be used with good results when studying *science*, *social studies*, and other subjects that are packed with important information.

1. *Read the title* of the chapter to find out what subject will be discussed.

2. *Preview* the chapter. In previewing do these things: (a) study maps, graphs, or pictures given in the chapter; (b) observe the organization of the chapter by noting headings printed in boldface or italics; (c) read these headings carefully and think of them as an outline of the chapter; (d) read the first two or three paragraphs to discover the pattern of writing; (e) read the last two or three paragraphs to get the summary of the chapter in mind; (f) examine any exercises at the end of the chapter which you are supposed to do.

It may take you four or five minutes to do this preview, but you will find it to be very worthwhile.

3. *Set up your purpose* for reading the chapter. Are you reading it so that you can participate in class discussion? Are you reading it to prepare an oral report? Are you reading it to take notes to use in studying for a test? Are you reading it so that you can do the exercises at the end of the chapter? Whatever your purpose is, get it clearly in mind before you start.

4. *Study the chapter carefully*. Read as fast as you can, but not so fast that you do not understand what you are reading. Read in the way that will best meet the purpose that you have in mind.

5. *Review*. Glance over the chapter again. This time pick out and try to fix in mind those facts that you need to fulfill the purpose for which you read.

Below you will find a *history* selection. This selection is about an early explorer. This explorer is as famous in history as the first man to reach the moon may be. You know the story of this man's discoveries, for he is none other than Columbus. But do you know about all of the things that happened to Columbus's body after he passed away? The selection below will give you this information.

Use the plan suggested above in studying this selection. Preview, then do the Preview Test. Study carefully and review to prepare for the Test After Careful Reading.

WHERE IS THE TOMB OF COLUMBUS?



Columbus spent the last years of his life in Spain. He was sad, broken in spirit, and without money. The end came in 1506. After the funeral his remains were taken to Seville and laid in a monastery beside the bones of his son, Diego.

THE MOVE TO SANTO DOMINGO

As you know, Columbus discovered the West Indies. He was very fond of Hispaniola, the island which today is divided into Haiti and the Dominican Republic. In his will Columbus requested that his remains be allowed to repose in Santo Domingo, the capital of his beloved island, "Española."

In 1542 the colony on Hispaniola asked Spain to send the remains of Columbus to the island. They insisted that his request to repose in Santo Domingo should be granted.

So Charles I of Spain sent the body of Columbus to Santo Domingo. He also sent the body of Christopher's son, Diego. The bodies were placed in tombs beneath the Cathedral of Santo Domingo. There they lay undisturbed for two and a half centuries.

THE MOVE TO CUBA

In 1795 the island of Hispaniola was ceded by Spain to France. Because of this change of control, the Spanish governor of the island was forced to withdraw. Before leaving he asked to have the remains of Columbus moved to Cuba. The following year the coffin of Columbus was sent to Havana, Cuba. At least, everyone believed that the coffin sent was the coffin which contained the dust of Columbus.

DISCOVERY OF COLUMBUS' REMAINS AT SANTO DOMINGO

In 1877 the Cathedral of Santo Domingo underwent

extensive repairs. During the course of these repairs a leaden casket was dug up. On the casket were these words: "Discoverer of America—First Admiral."

The President of the Dominican Republic, foreign diplomats, and other important people were called to the Cathedral. In their presence the casket was opened. On the inside of the lid was written: "Illustrious and Noble Man, Don Cristobal Colon."

As a result of this discovery, the Dominicans insisted that they had the real remains of Columbus. They placed the casket in a handsome urn in their Cathedral. It is there now and visitors are allowed to see it through glass panels.

THE MOVE BACK TO SEVILLE

Meanwhile, the other coffin, containing what many people still believed to be the body of Columbus, remained in Havana. At the end of the Spanish-American War in 1898, Spain lost Cuba. Because Spain no longer owned Cuba, the coffin in Havana was sent back to Seville in 1899.

Most people believe that the remains of Columbus are in Seville. But nobody knows for sure.

PREVIEW TEST

After you have finished your preview, answer these questions. They are based on the title, map, headings, and the first two and last two paragraphs.

- 1. What is the subject of this selection? _____
- 2. What two islands are prominent in this story? _____
- 3. What two cities does the map show as possible places where the tomb might be? _____
- 4. In what country did Columbus die? _____
- 5. In what city was he first buried? _____
- 6. To what city was Columbus's body next moved? _____
- 7. To what island was it next moved? _____
- 8. Where was a discovery of the remains reported? _____
- 9. Where was the Havana body moved? _____
- 10. Does anyone know for sure where the remains of Columbus really lie? _____

TEST AFTER CAREFUL READING

Write answers to the questions below after you have read the selection carefully and reviewed it for details.

- 1. When did Columbus die? _____
- 2. Where were his remains taken after the funeral? _____
- 3. Who sent Columbus's body to Santo Domingo? _____
- 4. Where was the body placed in Santo Domingo? _____
- 5. What happened to the island of Hispaniola in 1795? _____
- 6. Where was the body then taken? _____
- 7. In what year was another body found in the Cathedral of Santo Domingo? _____
- 8. What happened to the body that had been sent to Havana? _____
- 9. What historical event caused the removal of this body from Cuba? _____
- 10. On what date did this removal take place? _____

HOW TO READ FAST

The amount of reading that you have to do grows heavier each year as you pass through school. If you can increase your speed of reading at the same time that you are expected to read greater amounts of material, it will be an advantage to you.

The first thing to do in increasing your speed this semester is to get rid of any bad reading habits that you may have. If you still have any of the habits listed below, they will prevent you from reading fast. Check yourself on bad habits.

Answer these questions with "Yes" or "No."

- _____ 1. Do you move your lips when reading silently?
- _____ 2. Do you point to words with your finger as you read?
- _____ 3. Do you move your head from side to side as you read?
- _____ 4. Do you often re-trace a line with your eyes because you can't pronounce a word or understand the meaning?
- _____ 5. Do you read one word at a time?

Perhaps you have been doing some of these things for years. If so, it may take you some time to overcome them. But it *can* be done if you try.

In case you do have any of these habits, practice the helps suggested below. Maybe you can suggest other helps of your own.

- | | |
|------------------|--|
| Lip-moving: | Hold your finger over your lips or hold a piece of paper between them. |
| Finger pointing: | Hold your book with both hands, one on each side of the book. |

The first paragraph of the story below is divided into fairly large word groups, each of which represents an idea. Try to read each of these groups with just one glance. Fix your eyes in the middle of a group and try to read all the words on both sides without moving your eyes. Then rapidly move on to the next group and fix your eyes in the middle of that group, and so on.

After you have practiced reading long word groups in the first paragraph, read the rest of the story. Try to grasp several words at each glance, as you did in the first paragraph which was marked for you.

- | | |
|-----------------------------|--|
| Head-moving: | Nest your chin in one hand and hold it still. |
| Re-tracing lines: | Work hard on pronunciation and meaning helps given in this book. |
| Reading one word at a time: | Work hard at trying to take in several words at each glance. |

Fast readers know that the real secret of reading fast is to be able to take in entire groups of words at each glance. As soon as you learn to read for *ideas* instead of reading separate words or small groups of words, you are on the road to speedier reading.

You need also to step up your tempo. Maybe you have fallen into the habit of reading slowly. If so, you must put forth effort to quicken your pace. You walk faster when you want to cover more ground in a short time. Do the same thing with your reading.

Of course you should not try to read fast when you are reading material in which there are words that you don't know how to pronounce or meanings that you do not understand. In this book you are given help in pronouncing words and in getting meanings. If you do all of the activities carefully, you should not be troubled with word pronunciation and meaning difficulties. With these hindrances and bad habits out of the way, you should be able to read as fast as you want to.

Be sure to record your beginning time accurately.

If you are using this book alone, without a teacher to give you your starting and finishing time, use a watch with a second hand for timing yourself. If you haven't such a watch, perhaps you can find a clock with a second hand. If you do not have either a watch or a clock with a second hand, do the best you can with a minute hand.

Start on an even minute such as 5 minutes after 10:00 or 20 minutes after 2:00. Write your starting time at the beginning of the story and your finishing time at the end.

Beginning time: Hr. _____ Min. _____ Sec. _____

Tawana

Tawana is a cheetah/who lives/on a game farm/near the city of Edmonton. / He is one/of the most famous animals of Canada/and probably one/of the most expensive as well. / Al Oeming/bought him through a New York agent/for \$2500/when Tawana/was a

four-month-old kitten/living in Kenya,/Africa.

Tawana,/the little cheetah,/traveled to Edmonton by airplane,/without incident,/and he arrived at the Oeming home/to be welcomed/by the family and a group/of children/in the neighborhood.

These latter gazed at the jungle kitten with awe tinged with delicious fear. Tawana regarded them from his cage with the dignity and restraint of manner for which he has become well-known.

As a tiny kitten, Tawana was captured in the jungle. Having been a pet of some African houseboys before leaving his native land, he had grown accustomed to human beings and easily accommodated himself to the role of family pet in the Oeming household. He went along with the family on automobile trips, and passers-by were sometimes startled to see a cheetah sitting with the children on the back seat of the car, eating an ice cream cone.

Tawana is now a handsome, full-grown cheetah with brown-spotted, amber-orange fur. He has become famous through traveling with his master on innumerable speaking tours and animal-buying trips and appearing in Hollywood films and on television.

People coming to a meeting to hear Al Oeming, Canada's foremost authority on northern wildlife, are startled to see a cheetah sitting quietly on the platform watching the crowd gather. Representing the many animals from all parts of the world living on the Alberta Game Farm, Tawana shows the success of Al

Oeming's unique experiment in animal conservation.

Once while Tawana was being exercised, a motorcycle roared by. Tawana had never seen one. He sped after it. The frightened cyclist stepped on the gas. Tawana increased his speed. Al, pursuing his pet by car, estimated that the pair were clocking 75 miles per hour. Tawana gained on, then passed the terrified cyclist. The badly-shaken man pulled to the side of the road and sat frozen as Tawana, the race finished, returned to stare at him. The frightened man stared back. He had never, in his worst dream, envisaged himself chased—or was it raced?—by a cheetah. As his owner drove up, Tawana turned away, hopped into the car, and gazed imperturbably out at the cyclist while that individual, at a discreet speed, resumed his journey.

Wherever Tawana and his master stop, flashbulbs pop. The fat, little jungle kitten from Kenya has become a celebrity.

When at home, Tawana lives in his enclosure on the Farm. Visitors see him walking about or sitting quietly aloof, looking off into the distance. Would he exchange, if he could, this way of life for that of the jungles of Kenya?

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:			

No. words $\frac{500}{\text{No. seconds}} \times 60 = \text{_____ WPM}$

Computing Your Speed

Write your "Beginning time" and your "Ending time" on the spaces above. Then subtract your "Beginning time" from your "Ending time" to find the total time that it took you to read about Tawana.

Suppose you started at 10 minutes after 10 o'clock; and that you finished at 12 minutes and 20 seconds after 10. Your figures would look like this:

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>
Ending time:	10	12	20
Beginning time:	<u>10</u>	<u>10</u>	_____
Total time:		2	20

Next you need to divide the number of words in the selection by your total reading time in seconds. The number of words in this selection is 500. The total number of seconds is $2 \times 60 + 20 = 140$. The number of words you read per second is $500 \div 140 = 3.57$. To find the number of words you read per minute, you would need to multiply 3.57 by 60. $3.57 \times 60 = 214.20$. In round numbers you read 214 words per minute. Using the letters WPM to stand for "words per minute" your answer would look like this: 214 WPM. Always round off any decimal.

To check your understanding write "yes" or "no" before each of the statements below.

Questions:

- _____

1. Tawana was imported from Kenya.

2. He lives at the Game Farm the year round.

3. He has been a household pet all his life.

4. He was sold for \$2100.

5. Tawana is well-known.
- _____

6. He lived in New York for a time.

7. He was afraid of the motorcycle.

8. Tawana has been in the movies.

9. He has never been on television.

10. He appears disdainful of photographers.

UNIT TWO

THE SEA—TREACHEROUS BUT PRODUCTIVE



Are you fond of sea stories? Here is an exciting one about two brothers who lived in a fishing village on the shores of the Red Sea. The older brother, Gomez, looked upon his younger brother, Omar, with scorn because Omar couldn't do all of the things that Gomez could do. The boys forgot their differences, though, when faced with a great danger.

You will want to read this story rapidly because you will be interested in finding out what happens and how the story ends.

Beginning time: Hr. ____ Min. ____ Sec. ____

A SPEAR FOR OMAR*

Omar knelt at the bottom of a small dugout canoe and let his hand drift in the balmy water of the Red Sea. He loved this hour of the day. It usually made him feel peaceful and happy. Today, however, there was no peace in Omar's heart, for he had failed again.

Omar's father was the best spear fisherman from Suez all the way down to Port Sudan. And Omar's brother, Gomez, promised to be as good as their father. Gomez was already very skillful with the spear, and deep diving held no fears for him.

Gomez went to the sea daily with his father, and his catch contributed much to the support of the family. Omar went to work with his father and brother each day, also. He did whatever he could to help, but he had not yet learned to spear fish. He even was afraid to dive, much to the disgust of his older brother. Gomez looked upon him with contempt and poked fun at him because of his fear of drowning under water.

Omar's father was more understanding. "You'll learn in time," said he to Omar, "and when you do I'll give you a beautiful spear of your own."

* Rado, Heddy, "A Spear for Omar," *Story Parade*, September, 1954, pp. 21-25. Adapted by Nila Banton Smith and printed by permission of the author.

Omar (ō'mär): The name of a boy in the story.
Gomez (gō'māz): The name of another boy in the story.
contribute (kōn trīb'ūt): To give in common with others.
disgust (dis gūst'): Intense dislike for.
admiration (ād'mī rā'shūn): Esteem.

But that night as the three canoed home the spear seemed very far off. Omar had failed miserably in his diving as usual. He was deeply troubled.

The next morning Gomez and Omar went to the sea alone. Gomez gripped his heavy spear at once, shot far down into the water and came back with a fine fish.

"How about you coming down?" he asked Omar.

"I will, I will in a minute," replied Omar as Gomez shot down for another fish.

Suddenly Omar became aware of something happening. As he looked to the right a huge shark emerged from the deep water and began circling the boat.

Omar scanned the clear deep water for his brother. About fifteen feet below, half hidden by a ridge in a coral reef, he saw Gomez.

Omar cried out in horror. He saw that his brother's hand had been caught in the jaws of a mammoth clam, and that he was trying desperately to free himself.

Omar felt his mouth go dry as he lowered himself into the water. He did not turn his head when the shark moved in closer. Without any outward sign of his deadly fear, he went straight down.

emerge (ē murj'): To rise from or out of.
desperately (dēs'pēr it lī): Without hope; in despair.
ignore (ig nōr'): To pay no attention to.
murderous (mūr'dēr ūs): Having the purpose of murder.
approval (ā prōv'āl): Act of thinking well of.

Never before had Omar dived so deep as that, and he felt as if his lungs would burst. For a second everything went black before his eyes. But then he saw his brother in front of him with his hand in the clam's jaws. There was hardly any breath left in Gomez. He looked at Omar with horror in his eyes.

Omar acted quickly. With deft fingers he pried the clam loose from the coral. He left it attached to Gomez's hand because he didn't want to waste precious time.

The shark swam toward them. Trying to ignore the great monster, Omar grabbed Gomez by the armpits and started upward. Suddenly the shark's murderous yellow eyes seemed to look directly at Omar. The shark came in closer, his powerful, fanlike fins almost brushing against Omar.

In desperation, Omar took the last measure his father had taught him to use in an emergency like this. He let go of Gomez with his right hand, raised his arm, and slapped the shark across its pointed nose. Then he struck again and again and again.

For a long moment the shark seemed stunned.

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:	_____		

COMPREHENSION QUESTIONS

- How did Gomez and his father earn a living for the family? _____
- What contribution did Omar make to the support of the family? _____
- In what way did Omar feel that he had failed? _____
- What did Omar see circling him one morning while he sat in the canoe? _____
- Where was Gomez, and what had happened to him? _____
- When Omar reached Gomez what did he do about the clam? _____
- What did the shark do while Omar was on his way up with Gomez? _____
- What did Omar do to the shark? _____
- How did Omar get the clam off Gomez's wrist? _____

Then he churned about, brushing against Omar's face with his rough fins, and turned towards the deep water.

Omar grabbed Gomez with both hands again, swam to the top, and pushed him into the canoe. He whipped out a knife with a strong handle and chipped away part of the shell. Gomez winced with pain, but Omar worked fast until he could press the knife in and pry the clam open.

"It's only a flesh wound and will heal fast," Omar said after he had examined the wrist. He wrapped his dry shirt around Gomez's arm to stop the bleeding.

His brother opened his eyes weakly. He smiled at Omar, and his smile was full of love and admiration. "Thank you, my brother," he said, "thank you."

The next morning when Omar awoke, he found a spear next to his sleeping mat. His father stood looking down at him, warm approval in his eyes. Omar jumped to his feet, gripping the spear tightly in his hand.

"You will be a fine spear fisherman, my son," his father said. Omar lowered his head, a great surge of happiness rushing through him.

No. words $\frac{780}{\text{No. seconds}} \times 60 = \text{WPM}$

- How did Omar's father reward him? _____

Comprehension score: _____ Rate: WPM _____

DISCUSSION QUESTIONS

- Compare the attitudes of Gomez and of Omar's father toward Omar's fear of diving. _____
Which attitude would you have taken toward Omar? _____
- What do you think Gomez really had in mind when he asked Omar, "How about you coming down?" _____
- For whom did you have more sympathy at the point in the story in which Omar reached Gomez? _____
- Do you think Omar should have relieved Gomez of his pain by removing the clam while they were still under water? _____ Why? _____
- Did you like Gomez more or less at the end? _____ Why? _____

OMAR'S ROLE IN HIS FAMILY



Omar's Role



Your Role

Read the selection below to find suggestions of ways in which you can take responsibility in your family.

This selection contains material which is similar to

the content that you find in your *citizenship* books. It is fairly easy, and you can read it rapidly. If you really grasp all of the suggestions, however, you will not be able to read the selection as fast as a story.

Omar and his brother shared in responsibility for earning a living for their family by helping their father in his fishing. Young people in Omar's country must learn at an early age to work full time.

Most Canadian boys and girls do not become full-time workers until they are several years older than Omar was. They can, however, share in family responsibilities at an early age.

1. Read the title and think about it.
2. Study the pictures.
3. Read all of the boldface headings to find out what large topics are discussed in the selection.
4. Jot down your beginning time.
5. Read the entire selection carefully to find what points are made under each boldface heading.

Beginning time: Hr. _____ Min. _____ Sec. _____

SHARING RESPONSIBILITIES IN FAMILY LIFE *

Canadian family life has been influenced by our democratic ideals. In many families, the father no longer decides all important matters as he did in families of a hundred years ago. The mothers and fathers of today share equally in the responsibilities of making a home and bringing up their children. The children often are given an opportunity to express their opinions and desires. Each member of the family is treated as an individual, and all share together in work and fun.

SHARING IN WORK AROUND THE HOME

Have you ever thought about some of the ways in which you can help to take responsibility for the good of your family group? One such way is avoiding waste. By turning off lights which are not needed and by not wasting water, you can help to save expense. The money saved can be used to help provide things your family might not otherwise be able to afford, such as a vacation trip or a new car.

You can also help by taking care of the things you use. Care of your personal clothing can make it last

longer. By using the furniture in your home with care you can help to make it last longer. Taking care of things saves your family money that can be used for other needs.

There are many things you can do in your home to help save expense. You may be able to wash the family car when it needs cleaning. Caring for younger children helps by giving parents more time for other things. You can show your willingness to take responsibility as a member of your family team by making a list of jobs you can do. Your list may include washing the dinner dishes, mowing the lawn, running errands, or caring for pets.

WORKING AT PART-TIME JOBS

Many Canadian teen-agers begin to work at part-time jobs outside the home. Between the ages of 14 and 17 many young people take such part-time jobs throughout the year. During the summer months the total number of workers in this group increases considerably. The money earned in this way often helps to pay for clothing and school expenses and provides

* Based on material prepared for this book by John Heine.

responsibility (rê spôn'sī bīl'ī tī): What one is answerable for.
contributing (kōn trib'ū tīng): The act of giving or doing something for the purpose of helping others.
consumer (kōn sūm'ēr): A person using goods.

influence (in'flō ōns): To change or determine.
individual (in'dī vid'ū āl): A single human being, as set apart from the group.
consider (kōn sid'ēr): To think a matter over carefully.

spending money for teen-agers. All of this helps families to stretch their dollars further.

BEING WISE CONSUMERS

Young people can also help their families by being wise consumers. Do you try to shop wisely and save money by making sure you are getting the most for what you spend? When you buy clothing, do you look for sales at which you may buy what you need for less money? Do you try to apply what you have learned at school about healthful diets when you help with the family marketing? You can gain a very good experience in wise spending if your parents will agree to let you do the family's food-buying for a week. You will then have a chance to keep within an agreed figure and to plan the meals so that they result in a well-balanced diet.

	Hr.	Min.	Sec.
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:			

UNDERSTANDING OTHERS' POINTS OF VIEW

Families are happiest when each member can understand the others' points of view. In the story "A Spear for Omar," Gomez didn't try to understand Omar's point of view, and the result was not pleasant. Many homes are unhappy because husband and wife fail to adjust to their normal differences of opinion. Your family is a good place in which to learn how to get along with other people, for here we have people of both sexes and of different age groups. Each of us is likely to think first of himself, and not to consider the desires of others. An important part of growing up, however, is learning that you will be happier in the long run when you consider the happiness of other people. Not everyone can agree in the happiest families, but differences can be solved by talking problems over and by a willingness to give as well as take.

No. words	690	×	60	=	_____	WPM
No. seconds						

ACTIVITY 1—COMPARING CONTRIBUTIONS TO FAMILY LIFE

First, read the following paragraphs about Omar's home and town. Then, under each of the headings below, write some things that you can do and things that Omar can do. When you have finished both lists, check in your own list those things you can do that Omar cannot do; and in Omar's list, check those things Omar can do that you cannot do.

OMAR'S HOME AND TOWN

Omar's home is in a very small fishing village on the Red Sea. His family has no radio or television set or automobile. There are no flowers or grass around the house. It stands in the midst of a plot of sand. His mother weaves rugs at home. A rug dealer provides

the wool for her and pays her a small sum for her work. There are small grocery stores and dry-goods shops in the town. The shopkeepers and other businessmen do all of their own work. Once in a while a boy is hired to deliver an order.

SHARING IN WORK AROUND THE HOUSE

<i>Things You Can Do</i>	<i>Things Omar Can Do</i>
_____	_____
_____	_____
_____	_____
_____	_____

WORKING AT PART-TIME JOBS

Write these headings on a separate piece of paper. Then write your lists under them.

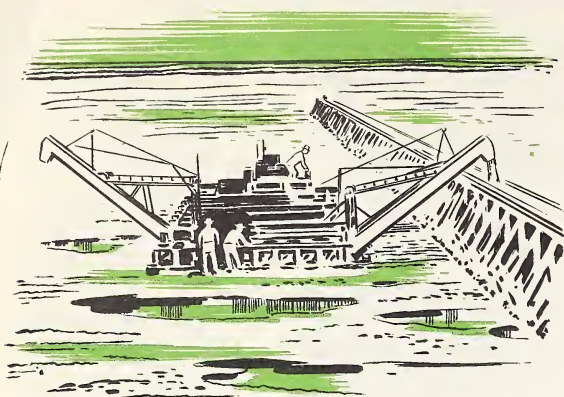
<i>Part-Time Jobs You Can Do</i>	<i>Part-Time Jobs Omar Can Do</i>
----------------------------------	-----------------------------------

ACTIVITY 2—UNDERSTANDING OTHERS' POINTS OF VIEW

Write these headings on a separate piece of paper. Then write the names beneath each heading.

<i>Whose Points of View Can You Try to Understand?</i>	<i>Whose Points of View Can Omar Try to Understand?</i>
--	---

MINERALS AS WELL AS FISH



Science books have different patterns of writing in them. You should read each pattern according to the plan best suited to it. The selection on pages 6 and 7 represents the problem-solving pattern. You learned a certain procedure to use in studying that pattern. The selection below represents the classification pattern. You will now be given help in reading this kind of pattern.

In using the classification method, scientists sort out groups of things that belong under the same gen-

Like Omar's father and brother, thousands of fishermen risk the dangers of the sea to earn their livelihood. There are other men, however, who value the sea for other things. Not only do the oceans abound with fish, they are also a fine source of some of the most important minerals known to man. You will read interesting information about some of these minerals in the selection that follows.

eral headings and tell how the groups differ from one another. So in reading classification selections, you should first get the different groups in mind, then find out what is special about each one; that is, how each one is different from the other.

Use this procedure in studying the classification selection on minerals:

1. Read all of the boldface headings to find out the names of the different classes of minerals.
2. Read the material under each heading to find:
 - a. how that particular mineral is mined.
 - b. what its special uses are.
3. Review the article for the purpose of recalling the specific information necessary in doing Activity 1.

MINING THE OCEAN *

SALT

The sea is salty, and salt is the mineral most easily obtained from the ocean. To mine this salt, men pump sea water into basins and let the water evaporate, so that the salt is left behind. Then a huge tractor, like the one pictured, dredges the salt onto a moving belt that carries the salt to a refinery.

Besides improving the taste of foods, salt is known to be necessary to keep us in good health. In addition, salt is used in hundreds of industrial processes and in the manufacture of many important products, such as hydrochloric acid, washing soda, lye, and soaps. Salt is also used to preserve foods. Refrigeration plants use salt in the manufacture of ice.

The chemical name for salt is sodium chloride. This tells us that the elements sodium and chlorine are present in this common mineral substance. If an

electric current is passed through salt water, both elements can be removed. The chlorine obtained is used as a bleaching agent in the paper and textile industries. It is also used in the manufacture of such chemical products as chloroform, explosives, and dyes.

The sodium obtained from salt water also has many important uses. Chiefly, it is employed in the manufacture of several dyes and drugs. You may have seen the bright yellow sodium vapor lamps which are used to light many highways.

BROMINE

Another mineral in sea water is bromine. Huge plants along the Atlantic coast and the Gulf of Mexico pump millions of gallons of water each day. The water goes through a chemical treatment which finally removes the bromine as a dark red liquid. While only about one pound of bromine can be removed from 1,800 gallons of salt water, the process is worth the effort because of the important uses of bromine.

* Based on material prepared for this book by Irving Zeichner.

classification (klās'ī fī kā'shūn): Act of arranging in groups.

substance (sūb'stāns): Any particular kind of matter.

evaporate (ē vāp'ō rāt): To pass off in vapor.

hydrochloric (hīdrō klō'rik): Pertaining to an acid combining hydrogen and chlorine.

bromine (brō'mēn): A deep-red liquid with a bad smell.

magnesium (māg nē'shī ūm): A silvery-white element.

sodium chloride (sō'dī ūm klō'rid): Common salt.

disinfectant (dis'in fēk'tānt): An agent that destroys disease germs.

chloroform (klō'rō fōrm): A colorless, heavy liquid used as an anesthetic.

explosive (ēks plō'siv): Suited to cause an explosion.

artificial (ār'tī fish'āl): Changed by human skill or labor.

photography (fō tōg'rá fī): The art of taking pictures with a camera.

Bromine is used in making “anti-knock” gasoline. “Ethyl,” which is added to gasoline, is a compound made with the help of bromine. It is used also in the manufacture of drugs, dyes, photographic film, and “tear gas.”

MAGNESIUM

Magnesium, a strong, lightweight metal, is also “mined” from the sea. Factories along the gulf coast of Texas remove this metal from ocean water in the form of a compound, magnesium chloride. Later the metal is melted and treated with electricity to free the pure magnesium. A plant can remove as much as six pounds of magnesium from a single ton of sea water. Magnesium is light in weight, and when mixed with aluminum it makes a very strong alloy. This mixture is ideal for use in aircraft and in many common articles like stepladders and wheelbarrows.

Magnesium burns with intense heat and light. It is therefore valuable in the manufacture of such things as signal flares, flashlight bulbs, and certain types of bombs.

IODINE

You probably think of iodine as a brown liquid in a

bottle in the medicine chest. While iodine is used for treating cuts, it has other important uses. Iodine compounds are used in photography and in the manufacture of dyes and drugs. Recently, an iodine product, silver iodide, has been used in artificial rain-making.

As you may have guessed, iodine is another substance taken from the sea. Sea water contains only one part of iodine in about 300 millions. The bodies of certain seaweeds, however, may contain almost 10 per cent iodine. Therefore iodine is not taken from the sea water directly but is obtained from seaweeds. The seaweeds are burned, and iodine is removed from the ashes by a chemical process.

OTHER MINERALS

Other minerals taken from sea water include sulfur, calcium, and potassium. Even gold is present in oceans to some extent. No method has yet been found, however, for removing the small amounts of gold in paying quantities.

Some day perhaps, like Omar, you may earn your living from the sea. Your spear, however, may be a test tube and your “catch” may be minerals rather than fish.

ACTIVITY 1—CLASSIFYING INFORMATION

Classify the information that you just read. Write the name of each of the first four minerals discussed in the article, tell very briefly how each is taken from the sea, and give one or two uses of each.

	<i>Name of Mineral</i>	<i>How Mined?</i>	<i>Uses</i>
1.			
2.			
3.			
4.			

Applying What You Have Learned About Studying Science

Sometimes you will find entire chapters in your *science* books which deal with classifications. At other times only part of a chapter discusses classifications. Whenever you find this kind of material, work with it as you worked with the selection above.

1. Glance through all of the pages dealing with classifications and find out to which of the larger

groups each of the different kinds of things belong.

2. Read to find out how each of these things differs from the others in properties, characteristics, uses, sources, and so on.

3. Make a table similar to the one you made about minerals in the sea.

PROBLEMS ABOUT THE SEA

On this page and the next one you'll find some problems about the sea. They will give you more information and deeper insights in regard to the sea and its products.

whole to understand it, and (b) rereading the last sentence to make sure you know what you are to find. Do these two things in working with the problems below, and in addition (c) reread the problems to find out exactly what facts you have to work with. Sometimes all of the facts are not given in the problem itself, and you will need to refer to a table or even recall some of them.

Some of these problems have several parts to them. In such cases you will need to answer the same questions about each part of the problem.

Questions about the first part of the first problem are answered for you.

SEA PROBLEMS *

Here are some common measures:

5,280 feet = 1 land mile

6 feet = 1 fathom

6,080 feet = 1 nautical mile

3 nautical miles = 1 marine league

Recently, two men descended 13,287 feet into the ocean in a bathyscaphe (as shown above) to study marine life and to learn more about the depths of the sea. How many fathoms is this? How many land miles? How many marine leagues?

Part 1. a. What does the first question ask you to

find? How many fathoms
the two men descended

b. What number facts are you given?

13,287 ft.; 6 ft. = 1 fathom

Part 2. a. What does the second question ask you to find? _____

b. What number facts are you given?

Part 3. a. What does the third question ask you to find? _____

b. What number facts are you given?

2. The bathyscaphe provided enough oxygen for the men to remain under water for 32 hours. How many days is this? How many hours and minutes longer is this than the 3 minutes that one diver was able to stay under water without special equipment?
- Part 1. a. What does the first question ask you to

find? _____

b. What number fact is given you with

which to work? _____

c. What number fact do you have to supply? _____

Part 2. a. What does the second question ask you to find? _____

b. What number facts are you given?

3. A cubic mile of sea water contains about 440 pounds of gold. What part of a ton is this?

a. What does the question ask you to find?

* Based on material prepared for this book by Donald W. Lentz.

b. What number facts are you given?

c. What number fact do you need to supply? _____

4. Experiments show that, on the average, there are about 35 pounds of salt per 1,000 pounds of sea water. How many pounds of salt are there in a ton of sea water? How many pounds of sea water would be needed for one ton of salt? How many tons of salt water would that be?

Part 1. a. What does the first question ask you to find? _____

b. What number fact are you given?

c. What number fact must you supply?

Part 2. a. What does the second question ask you to find? _____

b. What facts are you given? _____

c. What number facts must you supply?

5. A cubic yard of sea water can yield 50 lbs. of salt. How many cubic yards yield a ton? How much salt can a cubic foot give? (27 cu. ft. = 1 cu. yd.)

Part 1. a. What does the first question ask you to find? _____

b. What number fact are you given?

c. What number fact must you supply?

Part 2. a. What does the second question ask you to find? _____

b. What number facts are given?

Summary

Write what you are to find in each part of each problem under the heading *To Find*. State this in as few words as possible. Under the heading *Facts* write the number facts that you will need in solving the problem.

<i>Problem</i>	<i>To Find</i>	<i>Facts</i>
1. Part 1.	<i>Number fathoms men descended</i>	<i>13,287 ft.; 6 ft. = 1 fathom</i>
Part 2.	_____	_____
Part 3.	_____	_____
2. Part 1.	_____	_____
Part 2.	_____	_____
3.	_____	_____
4. Part 1.	_____	_____
Part 2.	_____	_____
5. Part 1.	_____	_____
Part 2.	_____	_____

If you had trouble in finding number facts in these problems, practice reading many problems in your *mathematics* books, just picking out and writing the facts as you did in working with these pages.

REVIEWING CONSONANT SOUNDS

There will be consonants in all of the new words that you will meet in your reading this year. Can you make the best use of consonant sounds in pronouncing new words?

Reviewing Single Consonants

Review the single consonants in the exercises below to make sure that you have their sounds freshly in mind.

You know all of the words that follow. Underline the *initial* consonant in each one. Pronounce the word slowly and carefully. Think about the sound of the consonant as you do so.

hammer	sailor	lantern	rubber
kettle	dentist	jelly	pencil
turkey	zoo	wander	fancy
needle	buffalo	castle	master
center	gentle	vapor	gaily

You probably noticed two sounds of c in *center* and *castle* and two sounds of g in *gentle* and *gaily*. Perhaps you will recall that c and g usually have the soft sound (as in *center* and *gentle*) when these letters are followed by e, i, or y; and that these letters usually have a hard sound (as in *castle* and *gaily*) when followed by a, o, or u.

Underline the *final* consonant in each of these words. Then pronounce the word slowly and carefully, and think of the sound of the final consonant as you do so.

fond	Gomez	lung	chloric
sudden	Omar	clam	minerals
fail	shark	sob	chaff
	felt	grip	

Reviewing Speech Sounds

You will recall that speech sounds are different from blends. In the *blend* we hear a little of each of the consonants, which are blended together to make one sound. In *speech sounds* we do not hear either of the letters. We hear a new sound entirely.

The most common speech sounds are: sh, ch, th, wh, qu, ng, nk, ph, gh.

Here are some words you know. Underline the speech sound in each one. Pronounce each word and think of the sound of the speech sound as you do so.

share	finish	month	think
churn	whipped	young	shallow
graph	mink	quarter	ghost

Reviewing Blends

A blend, as you know, is one sound made up of two blended consonants. You will recall that the most common two-letter blends are:

bl, cl, fl, gl, pl, sl br, cr, dr, fr, gr, pr, tr
sc, sk, sm, sn, sp, st, sw, tw

The most common three-letter blends and blends with sounds are:

spr, str, shr, spl, sch, thr

You know the words below. Underline the blend or blends in each one of them. Sometimes you will find a blend at the beginning of the word, sometimes you will find it within or at the end of the word. Pronounce each of the words and think of the sound of each blend as you underline it.

grasp	contribute	space	school
blood	prepare	splash	people
plod	brisk	sweep	fruit
drone	stretch	flavor	valuable
thrilling	troubled	glad	spread
spear	scanned	skill	slick
stunned	slapped	smiled	crank
shrill	sniff	twenty	wrist

Applying What You Know About Blends and Speech Sounds

The words below are in the next unit. Underline all of the blends and speech sounds in these words, regardless of where they occur. If you can't pronounce some of the words, think about the sound of the blend or speech sound that you underlined. Thinking of the sound together with the vowel sound that goes with it should enable you to work out the pronunciation of any word in the lists.

spray	fathom	prevent	express
threaten	blister	destroy	eyelash
brittle	chestnut	crew	quest
employ	draft	stump	greasy
method	liquid	descend	trimmings
strain	slab	youth	burst

REVIEWING VOWEL PRINCIPLES

Do you recall these vowel principles?

1. When a one-syllable word contains two vowels, one of which is the final e, the first vowel is usually long and the final e is silent.

2. When there is only one vowel in a word and that vowel does not come at the end of the word, the vowel is usually short.

3. When two vowels come together in a one-syllable word, the first vowel is usually long and the second vowel is usually silent.

See if you can apply these principles in the words below.

Long and Short Vowel Sounds

Number each of the words below according to the number of the principle that applies to it.

_____fond	_____waste	_____foal	_____deal
_____dive	_____title	_____plot	_____rug
_____pain	_____sea	_____heal	_____stage

Two Vowels with One Sound

Several pairs of vowels represent the same sound when they appear together in words.

ay, ai, and ey all sound like long a, as in *say*, *hail*, *why*.

ea, ei, and ee all sound like long e, as in *peach*, *seige*, *sleep*.

oa, oe, and ou all sound like long o, as in *float*, *hoe*, *though*.

ie and uy both sound like long i, as in *lie*, *guy*.

Write each of the words below under the heading that represents the sound of the two vowels within the word.

weave
gay

stain
foam

receive
buy

soul
pie

Long a Sound

Long e Sound

Long o Sound

Long i Sound

The vowel principles apply to all of the words above, and to the majority of words in the English language. There are, however, some *exceptions*.

ie occasionally sounds like long e, as in *field*.

ie or ea sounds like long u, when followed by w or u as in *view*, *beauty*.

ea occasionally sounds like short e, as in *bread*.

Write these exceptions under the right headings:

shriek
lieu

deuce
head

tread
shield

Long e Sound

Short e Sound

Long u Sound

REVIEWING SILENT LETTERS

You have been working with vowel principles. You know that a final e is usually silent in one-syllable words. You also know that the second vowel is usually silent when two vowels come together in a word.

With these principles in mind, cross out the silent vowel or vowels in each of the words below. All of these words are in this unit or in the next two units in this book.

fail	feel	plain	raise
people	fairly	wise	ridge
receipt	meals	soaps	tube
date	apple	heat	marine
health	afraid	taste	reef
foam	lay	seize	float
brake	throat	reason	leak
aid	beetle	hoarse	speed

You know that consonants are sometimes silent, also. There are no principles to guide you in deciding when a consonant is silent. Usually, however, consonants are silent in these cases:

k when it comes before n, as in *knee*.

w when it comes before r, as in *write*.

c when it is joined with k, as in *kick*.

gh when it comes at the end or close to the end of a word, as in *though*.

t when it comes in the middle of a one-syllable word, as in *hatch*.

There are many other cases in which a consonant is silent in one or two words only, such as s in *island*, w in *sword*, and l in *calf*. In such cases we have no guidance in the way of comparison with other words. We just have to remember these exceptions.

Cross out the silent consonants in the words below. All of these words are in this unit or the next two units in this book.

weight	knife	struck	tightly
yellow	pick	catch	insight
own	although	might	knelt
wrist	stretch	often	bomb
knuckle	answer	vehicle	through
half	blight	chestnut	two
check	climbing	foreign	patch
wrap	thought	upright	packed
sought	sign	lightweight	frightening
struck	wreck	anti-knock	campaign

WORKING WITH COMPOUND WORDS

A compound word, as you recall, is made up of two words. The meaning of the compound word is different from either one of the two words which it contains.

Draw a line between the two words in each of the compound words below. Then write a definition giving the meaning of each compound word. The first word has been done for you.

All of these words appear in Unit Three.

campfire: a fire in a camp

underline: _____

lumberman: _____

elsewhere: _____

eyebrow: _____

eyelash: _____

baseball: _____

foolhardy: _____

lookout: _____

withdraw: _____

alongside: _____

corkscrew: _____

outskirts: _____

horsedrawn: _____

underwent: _____

roadway: _____

oncoming: _____

foreman: _____

airplane: _____

cornstarch: _____

sawdust: _____

boldface: _____

homemaker: _____

forefather: _____

woodland: _____

hillside: _____

overflow: _____

FINDING THE MAIN IDEA IN PARAGRAPHS

There is no reading procedure that will help you more than being able to find the main idea in a paragraph. You can always improve your ability to find main ideas quickly and accurately. The work which you do on these two pages will give you more practice in using this important skill.

See how quickly you can find and underline the main idea in each of the paragraphs below.

In working with these paragraphs you will sometimes find the main idea expressed in an entire sentence. At other times you will be able to pick out a part of a sentence that expresses the main idea. In such cases underline the part or parts and not the whole sentence.

The main idea in the first paragraph is underlined for you.

Coral

1. Coral, one of the most interesting objects found in the sea, is the limestone skeleton of an animal called a coral. This animal consists of a small jelly-like mass with a limestone skeleton and a sac in the center. Tiny arms branch out from the sac. The coral uses the arms to catch its food and to draw food into its stomach. When the coral dies, its stone skeleton remains.

2. As the limestone skeletons of the coral pile up one upon another, beautiful stonelike formations are made. The *tree coral* is a formation that looks like a little tree with branches. The *organ pipe coral* formation looks like a bundle of straws. The *brain coral* formation looks something like a human brain.

3. The reef coral is the most dangerous to ships. The coral that builds this kind of formation begins at the bottom of the sea. The next generation adds another layer onto the dead bodies of the first, and so on. After centuries these coral reefs reach within

four or five feet of the surface. Many a ship has been wrecked by running into these stonelike reefs.

4. Some kinds of coral, depending on their color and fineness, are valuable for jewelry. Pink and red coral are especially prized. Corals of these colors are found in the Mediterranean. There are many coral fisheries along the coast of this sea. Naples and Genoa are centers for the coral jewelry industry. Beautiful coral necklaces, bracelets, and other ornaments are made in these cities.

5. In olden times the red coral from the sea was supposed to possess mysterious properties. The Gauls decorated their weapons of war and helmets with it. The Romans hung branches of coral around their children's necks to preserve them from danger. They also believed that coral had medicinal properties. Even at the present time some people in foreign countries wear coral to protect them from the "evil eye."

In all of the paragraphs about coral you found the main idea in the *first* sentence of the paragraph. In the paragraphs below you will find the main idea in *different positions* in the paragraph. Find and underline the main idea wherever it appears.

The Sea Horse

1. Did you ever see a picture of a sea horse? If so, perhaps you thought it looked like a storybook dragon, instead of a little animal that lives in the ocean. Without a doubt the sea horse is one of the most interesting creatures in the sea.

2. The sea horse has a head like a prancing pony. Its body is covered with bony plates and spines. Its tail is like that of a snake. It has large eyes and a long snout. It resembles a fish only in that it lives in water and breathes through gills.

3. Sometimes the sea horse swims through the water. When it swims, it moves in an upright position with the use of a single back fin. At other times it curls its tail around a piece of seaweed and remains quiet. So you see, its habits are different from those of other fish.

4. You have read that the kangaroo carries its babies in a pouch. The male sea horse has a pouch, also, in

which he carries eggs laid by the female. The most peculiar thing about the sea horse is the manner in which the male cares for the female's eggs. He not only carries the young fish around in his pocket but also carries the young fish until they are big enough to take care of themselves.

5. The scientific name for the sea horse is *Hippocampus*. This word comes from two Greek words that mean "horse" and "sea monster." The name was given to this creature because its head looks like a horse, and because the rest of its body is shaped like some fanciful monster of olden times.

6. The sea horse is not a good swimmer and has no way of fighting other fish which may attack it. In spite of its helplessness, nature has protected it in two important ways. Its coloring resembles the sea weeds to which it clings so closely that it cannot be seen easily. Then, too, its bony plates and stiff spines do

not appeal to other fish who are looking for appetizing soft fish.

7. A small green sea horse is found in shallow water along the Florida coast. It is only two inches long.

On page 31 you had practice in using two important procedures when finding the main idea in paragraphs.

a. Picking out and underlining only the *important* words in a main idea.

b. Finding a main idea regardless of its position

The most common sea horse of the Atlantic coast of North America is about six inches long. Other sea horses of different lengths exist. There are some 50 species of sea horses ranging in size from 2 to 12 inches.

in the paragraph—at the beginning, middle, or end.

Use these two procedures in working with the selection below. Find the main idea in each paragraph. Underline the whole sentence when necessary. Underline short parts of the sentence if these sum up the important idea.

Pearls

1. You have been reading about some of the interesting things in the sea—minerals, coral, and the sea horse. You will now read about another product of the sea—the pearl. The pearl is much sought for as a gem. In fact it is one of the most precious of all gems.

2. Pearls are produced by shellfish such as oysters, clams, and mussels. Such mollusks line their shells with a smooth coating to protect their bodies from the rough shell itself. The mollusk exudes this substance from its body. The substance is a milky film when it is first produced, but it soon hardens into a many-colored layer known as *mother-of-pearl*.

3. If a grain of sand or a tiny stick or sea animal gets into the shell, it irritates the mollusk. The mollusk then covers the foreign substance with layer after layer of the lining material. In this way a pearl is made. So pearls really are produced by irritated shellfish.

4. Pearls are sometimes found in the shells of freshwater mussels. The chief producers of gem pearls, however, are the pearl oyster and the giant clam found in salt waters. Pearl-fishers say that oyster or giant clam shells that are irregular in shape, stunted in growth, or honeycombed by borers are most apt to contain good pearls.

5. Fresh water pearls are found in certain species of shellfish that live in mountain streams. River pearls have been found in Great Britain and in the United States. In Great Britain, rivers in Scotland and Ireland have produced pearls. In the United States, fresh-water pearls have been obtained from the Little Miami River in Ohio and the Mississippi River near Muscatine, Iowa.

6. Cultivated pearls are produced in different parts of the world. Oysters of the right species are gathered. A foreign substance is placed in the shell

of each one. Because of this irritant the oyster exudes layer after layer of milky fluid over the substance. This milky fluid hardens into a pearl, just as it would do if the oyster were in its natural bed in the sea.

7. The Chinese have been producing cultured pearls for many centuries. A process for causing artificial formation of pearls was discovered by Ye-jin-yang in the thirteenth century. It is still used in China, where it is the chief industry in several villages. Thousands of pearl mussels are gathered in May and June. The shells are pried open, and a pellet of mud or a tiny piece of bone or wood is placed inside. After being operated upon, the mussels are placed in shallow water. After two or three years they are again taken out of the water, their shells are pried open, and the pearls that have formed are removed.

8. The beauty and value of pearls depend upon color, "skin," luster, and form. A perfect pearl is round or pear-shaped. In some pearls the luster is on the surface. In others the surface may be dull, and the luster found beneath two or three of the outer layers. Such pearls have to be "skinned." This is a very delicate process which has to be done with a steel file under a magnifying glass. Drilling a hole in a pearl is also a delicate matter. The hole must be drilled in just the right place, or the pearl breaks in pieces. Pearl-stringing is also a real art which calls for special treatment.

9. The Europeans began gathering pearls from the Caribbean Sea in the sixteenth century. The pearl-fishing industry in the Indian Ocean, the Red Sea, and the Persian Gulf is 3,000 years old. Pearls are mentioned in a Chinese dictionary prepared earlier than 1000 B.C. Thus we know that the pearl is the oldest of gems.

Get a piece of paper. Write the numbers 1 to 9 down the left side of the paper.

Write the main ideas that you underlined in the selection on "Pearls." Write each main idea opposite the number on your paper that represents the number of the paragraph in which you found the idea.

When you have finished, read all of the main ideas. See if they give a good summary of the important points in the entire selection.

INCREASING YOUR SOCIAL STUDIES VOCABULARY

The words below are among those which appear most often in *social studies* books at your level. You will meet them very frequently in your reading, both in and out of school.

Study the pronunciation of each of these words to make sure that you know how to pronounce it correctly. Say each word to yourself, pronouncing it distinctly. Then read the meaning of the word and think about it.

alien
ā'lyēn A foreigner; one owing allegiance to another country.

alliance
ā'li'āns A union of interests between parties, states, or countries; a treaty.

appropriation
ā'prō'pri ā'shūn Money set apart by formal action for a specific use.

borough
būr'ō A town or village (term used in early times).

boycott
boi'kōt To join with others in deciding not to deal with a person or group.

commodity
kō'mōd'i tī Something of value; an article of commerce.

commonwealth
kōm'ūn wēlth A group of people united in common interests, and accepted as equals in authority. Spelled with a capital C, the word refers to a particular group, such as the British Commonwealth.

compensation
kōm'pēn sā'shūn Payment of an amount equal to worth of services or goods.

currency
kūr'ēn sī A medium of exchange, including coins and bank notes.

diplomacy
dī plō'mā sī Tact or skill in conducting affairs.

domain
dō mān' The possessions of a ruler or country.

emancipate
ē mān'sī pāt To set free or release.

emigrant
ēm'i grānt A person who leaves one country to settle in another.

enactment
ēn ākt'mēnt Legislative approval which causes a bill to become a law.

exempt
ēg zēmp't Free from some law, duty, or liability.

Choose one of the words in the column to the left to complete the meaning of each of the sentences below. Write the word in the blank space where it belongs.

1. A young man came from Italy to live in Canada.

He was an _____.

2. The Russians were asked to make _____ for damage to one of our airplanes.

3. The army fought to _____ the slaves.

4. The entire _____ was interested in promoting a new trade agreement.

5. The Members of Parliament could not reach an agreement on the _____ for national defence.

6. Some Canadian Indian tribes used wampum for _____.

7. Several countries of Europe entered into an _____ with the British Commonwealth for mutual protection.

8. In early times, a town or village was called a _____.

9. The Minister for External Affairs carries on business among nations with _____.

10. The bus passengers decided to _____ the bus company until their fares were lowered.

11. When Cortez conquered Mexico he added a vast _____ to the Spanish kingdom.

12. After 65 years of age a person's income tax is reduced, but he is not entirely _____ from taxes.

13. Sugar is an important _____ of the Hawaiian Islands.

14. In 1869 Canada made its first _____ of a bill to control the entry of people into Canada from other countries.

15. When you take a trip to a foreign country, you are an _____ in that country.

UNIT THREE

CONSERVATION OF FORESTS



You read a story in which one boy had a struggle with the sea. In this next story you will read about another boy who had a struggle with fire. This story about Jim is as thrilling as the one about Omar. Read it and decide which of the two experiences you would rather have had.

Time yourself while reading this story.

Beginning time: Hr. _____ Min. _____ Sec. _____

FOREST KILLER *

Jim insisted on the trip. "We've been planning for months to go after steelheads in the river," he argued with his Uncle Bob. "Besides, you promised. Remember?"

"Sure, I remember," said Bob Cotton. "But haven't you seen the papers? A forest fire's giving the mountains a hotfoot down there."

"Well, a few old trees on fire won't bother us," Jim insisted. "Soon it will be too late. The fall rains begin any day now. Then the water will be too high and muddy for fishing."

Bob Cotton muttered something about the foolhardiness of youth and said all right, they'd go.

The old sedan rambled steadily on, its nose pointed straight at the Rocky Mountain Reserve Forest. It was near evening when they passed the boundary markers. And five minutes later they were stopped by a ranger.

"Glad to see you fellows," he said, one foot on the running board. "We can use every additional man."

Uncle Bob listened without protest. It was too

much for Jim. "We didn't come to fight fire," he explained. "We're going fishing."

The ranger looked at Jim in amazement. "You *were* going fishing," he corrected. "Now you are going to fight fire, like it or not!"

Uncle Bob said quietly, "We're in the war zone, Jim. And we've been drafted, looks like. Come on, let's go."

Soon they reached a line of men who wearily shoveled dirt along a wide fire-break. Their soot-blackened faces and bloodshot eyes had the same expression one sees on the faces of battle-weary soldiers.

"Water!" one fellow called hoarsely. His eyebrows had been singed off. "We have to have water, Ranger!"

"Sure thing, Al," the ranger replied. "Here's a water boy. Tell him what to do."

Al pointed out several large canteens. "Head down the hill, over there. About a quarter-mile down you'll find a spring," he directed. "And hurry!"

Jim grabbed four canteens and set out. It was easy, going down the hill. But it was a different matter going back. The bitter smoke began to bite at his lungs and started him coughing. At last he came puffing into sight of the crew. "Water boy! Water boy!" the cry went up and down the fire line.

* Norton, Paul, "Forest Killer," *Story Parade*, March 1949, pp. 9-12. Copyright, 1949, by Story Parade, Inc. Reprinted and adapted by permission.

insist (in sĭst'): To hold to something firmly.

foolhardiness (fōol'hār'dī nēs): Foolishly bold.

Siskiyou (sĭs'ki yōō): Name of a national forest in northern California.

amazement (ā māv'měnt): Wonder, great surprise.

hoarsely (hors'li): Harshly, gratingly.

accustomed (ā kŭs'tŭmd): Usual; familiar through use.

canteen (kăn tēn'): A small flask for carrying water.

bandage (băn'dij): To bind or cover.

recognize (rĕk'ŏg nĭz): To know again; to recall something known before.

satisfaction (săt'is fāk'shŭn): Fulfillment of a need or desire.

The men dropped their tools, and the canteens passed around swiftly, each man gulping greedily to quench his burning thirst.

“Water boy! Water boy!” The cries seemed to ring out from every side. The shout came again and again. All through the night Jim carried water. He was half asleep on his feet, but the men had to have water to keep fighting the red monster that roared hungrily to the south.

Jim’s brisk trot became a dogged plod as the long night hours passed. At dawn he looked much like the other men—hair burned, eyelashes curled and brittle to the touch. He ran his fingers over the place where his eyebrows should be and felt no hair. He knew he looked like Al, red-eyed, black-faced.

His legs felt as if they belonged to a rubber man, not at all the legs he’d grown accustomed to. Odd . . . he didn’t feel so tired any more. It was odd he felt so light, almost floating along. Jim was climbing the hill again, now, the canteens banging together. And suddenly he began to float.

Or was it the ground that was floating . . . floating right up to hit him in the face?

Uncle Bob was rubbing something greasy over Jim’s face when he snapped out of it.

“Take it easy, Jim,” Uncle Bob said gruffly. “You went to sleep up there on the mountain.”

A bandaged face came into view. Jim recognized the voice. It was Al, the foreman. “Yes, he went to sleep, all right, after he’d packed tons of water up that hill. You kind of passed out, son.”

It was then that Jim heard the rain, and knew that the fight was over. The forest killer had, in turn, been killed by the friendly rain. Jim sighed, and tried to sit up. Strength was oozing back into his body again. He felt as stiff and sore as if he’d been beaten with a baseball bat. But he felt a kind of satisfaction, too. It had been a rough fight, and he had been an important part of it.

Uncle Bob was speaking, now. “I guess you won’t insist on going fishing again when there’s a forest fire in the way!”

“Yes,” Jim said slowly. “Yes, I think I would. But for a different reason.”

“I see your point,” Al spoke up. “The government pays men pretty good wages for fighting fires in the national forests.”

Jim looked at Al oddly. “Pay?” he asked. “Do we get paid? . . . That isn’t what I was thinking about. I was thinking about all those dead trees.”

	Hr.	Min.	Sec.
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:	_____	_____	_____

No. words 800 × 60 = _____ WPM
No. seconds _____

COMPREHENSION QUESTIONS

1. Why didn’t Uncle Bob want to go fishing? _____

2. What kept Jim and Uncle Bob from their fishing? _____

3. What did they find the first line of workers doing? _____

4. What did Al send Jim to get? _____
5. How had Jim’s face and head changed in appearance by dawn? _____

6. Jim was trying to decide which of two things was happening as he walked up the hill the last time. What were they? _____
7. What did Uncle Bob think had happened to Jim? _____

8. What did Al say had happened? _____

9. What did Al think when Jim said he’d go fishing again, even if there were a forest fire in the way? _____

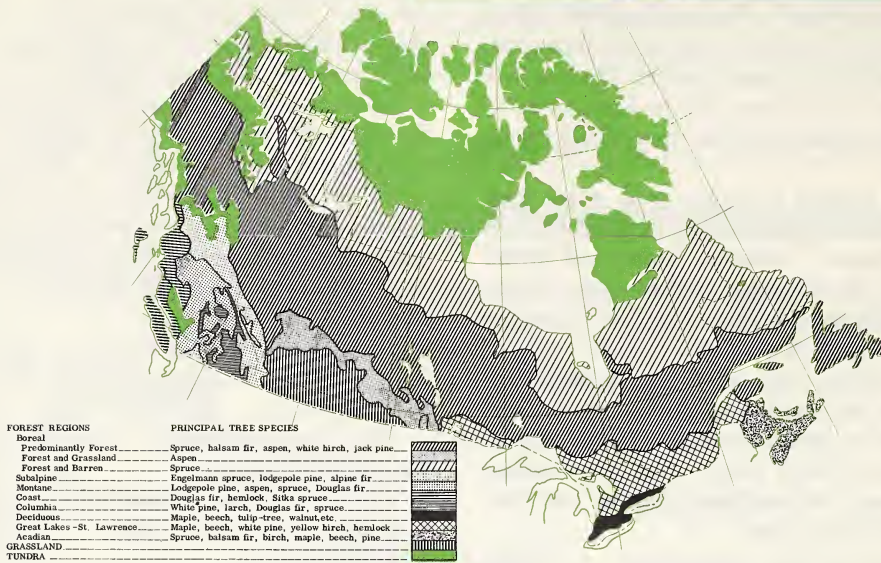
10. What was Jim really thinking about? _____

Comprehension score: _____ Rate: WPM _____

DISCUSSION QUESTIONS

1. Which experience would you rather have had, Omar’s or Jim’s? Why?
2. What is a fire-break, and how would it help to put out a fire?
3. What did the author mean when he wrote, about “the red monster that roared hungrily to the south”?
4. How did Jim’s attitude toward forest fires change between the beginning and end of the story?
5. What do you think was the one most important factor in causing this change in Jim’s thinking?
6. Why would the government pay the men to fight a forest fire?

FORESTS, THE BACKBONE OF CANADA



1. What type of forest covers the largest area in Canada? _____
2. Name the trees which grow in this area. _____

3. What part of Canada has very few trees? _____
4. Why do you think the types of forests do not follow the lines of latitude? _____

The selection below gives you additional information about forests in our country.

1. Read all of the boldface headings.
2. Glance through the entire selection quickly to find the main idea in each paragraph. Underline the main idea in each paragraph.

3. The main idea in each paragraph expresses the author's opinion. Read the entire article carefully to find the facts that support the opinion which the author states in each of his main ideas. This will require such careful reading that you shouldn't try to time yourself.

OUR FORESTS ARE WORTH PRESERVING

The history of Canada is staged against a forest background. Though there is no record of any civilization beginning in a forest, forests have had a great influence on the history and welfare of mankind in every land, in all ages. The forests located on our eastern seaboard and on the banks of the great rivers enabled the early colonists to build up a thriving trade. Most of the oak and pine trees were used for building ships. By 1878 Canada was the fourth among the ship-owning nations. With the coming of steel ships, Canada's power as a maritime nation declined. Yet Canada's forests are still worth preserving.

THE PRESENT STATUS

Nature herself seems to have decreed that Canada's destiny must depend in large measure upon her forests. The forest industries account for the largest class of Canada's exports, providing 30 per cent of the total value, and were calculated as worth \$1592 million dollars in 1960. Newsprint, lumber, and wood pulp accounted for 90 per cent of the total; of this, 79 per cent was shipped to the United States and 11 per cent to the United Kingdom. Canada accounted for 20 per cent of all wood pulp and 55 per cent of all

newsprint produced in non-communist countries in 1959, and is the leading exporter of pulp and paper products. In addition, Canada supplies one third of the lumber trade throughout the world.

FOREST POLICY AND MANAGEMENT

About 90 per cent of Canada's forest lands are publicly owned, the remainder being owned by private individuals and corporations. Forests lying within the boundaries of each province, like other natural resources, are administered by provincial governments. Rights to cut timber are given to commercial operators or individuals by timber leases or licences. These permits are issued in return for payment. However, both the federal and provincial governments make very strict regulations concerning the cutting and re-planting of forests, and the precautions to be taken against fire. Forest rangers and scientists work

throughout the year to see that such regulations are carried out.

BY-PRODUCTS OF WOOD

Though steel replaced the wood for ships, it seems unlikely that forest products will ever be neglected. Scientific research has found new uses for wood and products derived from wood. Plywood, fibreboard, and particle board are versatile materials used extensively in modern construction. Many plastic materials, such as cellophane, safety film, Celluloid, rayon, and numerous other products of prime importance are based on cellulose, one of the two major constituents of wood. Charcoal, rosin, turpentine, essential oils, sugars, alcohol, and various organic acids may be obtained from wood by chemical processing. As supplies of raw materials other than wood are used up, increased chemical utilization is to be expected.

ACTIVITY 1—STATING OPINIONS AND SUPPORTING FACTS

Write statements of the author's opinions as expressed in the main ideas in the first, second, and fourth paragraphs. Then write briefly the facts which the author gives to support his main idea in each paragraph.

Author's Opinion: _____

Supporting Facts: _____

Author's Opinion: _____

Supporting Facts: _____

Author's Opinion: _____

Supporting Facts: _____



This airplane is spraying a forest with DDT to kill bark beetles.

SCIENTISTS WAGE A BATTLE AGAINST FOREST DESTRUCTION

You have read that the Government is trying to save our forests. To aid in this effort scientists have been called in to help solve some of the problems. The article below will tell you what these problems are and how scientists are solving them. This is another science selection written in the problem-solving pattern.

1. Your first step is to identify the problems. Scan the entire selection to find the problems. As soon as you locate one of the problems draw a line under it. In most cases you won't need to underline an entire sentence, only the group of words that state the problem.

2. Read the article carefully to find how scientists solved each problem you underlined.

3. When you begin to read carefully, time yourself. You won't be able to read *science* material as fast as you read a story, but you can read it faster than you do now.

Beginning time: Hr. ____ Min. ____ Sec. ____

HOW SCIENTISTS ARE MEETING FOREST PROBLEMS *

In the last selection you read that the forest rangers are responsible for enforcing fire regulations. The average annual loss from forest fires in Canada is given as more than nine and a half million dollars. It is impossible to estimate the total loss in dollars and cents.

Scientists in forest and range experimental stations have studied this problem of fire. Their studies have resulted in many helpful solutions. Fire lookout stations and airplane spotting are used to detect fires before they can cause great damage. Experts are sent to the scenes of small fires by radio messages. Airplanes and helicopters are also frequently used to spray the fires with water or chemicals. Bulldozers are sometimes brought into an area to dig ditches that will prevent hungry flames from spreading. In some forest lands, fire lanes, or "breaks," have been cleared to keep a fire from moving from one area to another.

The white pine blister rust has destroyed millions of acres of beautiful white pines. This disease is caused by a fungus which girdles the trunk of the white pine. Sap is prevented from rising and the tree

soon dies. Recently scientists discovered that the disease spreads in an unusual way. The fungus does not move from pine to pine but spreads from the pine to a gooseberry or currant bush and then back to the tree. After this discovery the problem of control was made easy. All of the gooseberry or currant bushes in the neighborhood of an infected tree are destroyed. In this way the disease is kept from spreading.

Bark beetles and other insects are among the great enemies of our forests. Early detection by watchful forest scientists and the use of DDT and other insecticides save us millions of feet of lumber yearly. These insecticides are often sprayed by airplanes. Scientists have also been successful in destroying insect pests by bringing in birds and insects which feed upon the harmful bugs.

One of the problems of the past has been the great waste of forests by lumbermen. Scientists are now teaching lumbermen how to manage forests. For one thing the scientific lumberman removes ripe or old trees to allow room and food for young ones. Decayed and diseased trees are destroyed. Nature's own methods are used by allowing enough trees to stand so that natural reseedling will occur. Bare forest land

* Based on material prepared for this book by Irving Zeichner.

infect (in fēkt'): To affect with germs or bacteria.

insecticide (in sēk'tī sīd): A preparation for destroying insects.

radiation (rā'dī ā'shūn): The giving-off of heat and related forms of energy such as atomic or light waves.

helicopter (hēl'ī kōp'tēr): A form of aircraft which has whirling blades instead of wings.

operation (ōp'ēr ā'shūn): A doing or performing of some action.

may be replanted by tree-planting machines or by re-seeding from helicopters. In this latter method, seeds are placed in slitted lead pellets dropped from the air. Thus, the seeds are given a good growing start. Although we are still using more lumber each year

than our forests are regrowing, there is every hope that science will help us to improve our forest "bank balance." With protection from fire, disease, and insects, young seedlings will grow into fine timber so necessary to our nation's welfare.

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>	
Ending time:	_____	_____	_____	No. words $\frac{485}{\quad} \times 60 = \text{_____WPM}$
Beginning time:	_____	_____	_____	No. seconds _____
Total time:	_____	_____	_____	

ACTIVITY 1—LISTING PROBLEMS AND THEIR SOLUTIONS

Write the major problems that you found while scanning. Then write the things scientists have done to meet these problems. State both the problems and solutions in as few words as possible.

Problem 1: _____

Solutions: _____

Problem 2: _____

Solutions: _____

Problem 3: _____

Solutions: _____

Problem 4: _____

Solutions: _____

ACTIVITY 2—SUPPLYING MEANINGS OF YOUR OWN

- 1. Why do ditches or "breaks" keep fires from spreading? _____
- 2. Why do lead pellets give seeds a good start? _____

FOREST FIGURES



You have had practice in using reading skills in the first three steps suggested for solving the more difficult problems at your level. You need to make very sure of one more thing—what *process* to use in working the problems found in the *mathematics* books at your level. After you decide what you are to find and what number facts are given you to work with, then you must decide whether you are to add, subtract, multiply, or divide. You may have to read the problem through again in making this decision.

In working with the problems below:

1. Read each problem to understand it as a whole.

There were numbers in the last two selections that you just read. Chances are that there will be numbers in any selection that you may read about forests or forest conservation. A person must understand what is said with numbers in reading forest selections and in reading many other kinds of selections. Additional interesting information will be given you about trees and forests in the problems below.

2. Reread the problem to make sure of what you are to find. Write this information in your own words under the heading *To Find*.

3. Reread the problem to select the facts which are given to you to use in solving the problem. Write these number facts under the heading *Facts*.

4. Reread the problem to decide what process to use. Make the sign for this process under the heading *Processes*. For example, if you decide to add, you will place the sign $+$ under the heading; if you decide to divide you will place the sign $\div$ under the heading, and so on.

In computing some of the problems, you will need to use two steps. In such cases place two signs under the heading. For example, if you decide that you will need to multiply first, then divide, you would write these signs under the heading of *Processes*:

$\times$
 $\div$

Where necessary, use facts from the table below to solve the following problems.

WHAT BECOMES OF WOOD IN A TREE*

Left in stump, limbs, and roots	18.9	per cent
Bark	10.5	" "
Sawdust	11.0	" "
Slabs from sides of logs	7.1	" "
Trimnings and edgings from boards	7.1	" "
Careless waste	2.8	" "
Weight lost in drying	5.0	" "
Seasoned, undressed lumber	37.6	" "

1. A tree weighed 7,200 lbs. before cutting. Approximately how many pounds would be lost through drying? What would be the "dry weight" of the tree?

To Find

Facts

Processes

* Based on material prepared for this book by Donald W. Lentz.

2. Five trees were cut. The weights before cutting were as follows: 4,275; 6,180; 3,565; 5,875; and 2,720 pounds. How many pounds of seasoned, undressed lumber could be obtained from these trees?

To Find

Facts

Processes

3. An uncut tree weighed 6,924 pounds. How many pounds of this tree were lost in bark and sawdust together?

To Find

Facts

Processes

4. An uncut tree weighed 7,368 pounds. How many pounds were lost in making it into seasoned, undressed lumber?

To Find

Facts

Processes

5. Approximately 33 per cent of the forest fires are caused by camp fires and smokers. What per cent are from other causes? Out of the annual average of 5,700 fires, about how many are caused by camp fires and smokers?

To Find

Facts

Processes

6. The forests of Canada cover a total of 1,710,000 square miles. Manitoba and Saskatchewan each have about 120,000; Quebec, about 380,000; Ontario, about 260,000; New Brunswick, about 20,000. What per cent of our total forest area is in each of the above named provinces?

To Find

Facts

Processes

7. Use the facts in problem (6) to find what per cent of the forested land of Canada is in the other provinces and territories combined.

To Find

Facts

Processes

8. A recent report shows about 590 billion cubic feet of coniferous standing timber, and 130 billion cubic feet of broad leaved in Canada. What is the approximate total number of cubic feet of standing timber? What per cent of the total is coniferous? Broad leaved?

To Find

Facts

Processes

If you had correct information under all of the headings, you may compute the problems on a separate piece of paper.

If you made mistakes in filling in the information under the headings, then *read* many problems in your *mathematics* books, write the three headings for each problem, and fill in the information. Keep on practicing in this way until you can give the correct information for every problem you read.

Applying What You Have Learned About Reading Problems

Whenever you come to a problem that you don't quite understand, try reading and rereading it for the several different purposes for which you read the problems about forests. If the problem seems espe-

cially difficult, write the headings *To Find*, *Facts*, *Processes*. Then read to find and write the necessary information under each heading before computing the problem.

WORKING WITH ROOTS, PREFIXES, AND SUFFIXES

On page 30, you practiced breaking compound words into their parts so that you can easily define them. On these pages you will practice working with words made up of root words to which prefixes and suffixes have been added. You will meet many such words in your reading this year. These words are often quite long, and there may be times when you will wonder just how to attack them.

Working with Root Words

Long words formed from root words to which prefixes and suffixes have been added are as easy to divide and understand as compound words. When you come to a long word that puzzles you, the first thing to do is to find the root word. Then consider the prefix or suffix.

A. Each of the long words below is built up from a shorter word that you know. Find that root word and underline it. If a final e has been dropped when a suffix has been added, underline as much of the root word as is left.

frightening
dislodged
emergency
dangerous
unharmed
lessened
coldness
indicating

frantically
connection
development
comparison
protection
roughest
mentioned
electricity

responsible
transportation
amusement
equipment
shortened
fascinating
employment
selection

effectively
mixture
generator
information
pressure
ignition
computation
combination

B. Make different words by adding one of the suffixes below to some of the root words which you underlined above. Be sure, however, to make a *real* word each time you add a suffix.

ment	less	ness	est	er	able	ible	ion	ency
------	------	------	-----	----	------	------	-----	------

C. Make new words by adding one of the prefixes below to root words which you underlined above. You may add d or ed to some of the root words if you like. You may also use one of the words with the suffix attached to it as it appears in the list at the top of the page.

un	re	dis	semi	de
----	----	-----	------	----

Making New Words by Adding Prefixes and Suffixes That You Know

A. Add the prefix re to each of the words below to make another word.

_____seeding _____planting _____forestation

B. Write one of the words that you have just made in each of the sentences below.

1. Forests are disappearing. All of us should be interested in _____.
2. Mr. Thomas planted some young trees. They did live. Soon he was busy _____ them.
3. James planted some flower seeds. The birds ate them up. So he did some _____.

C. Add the suffix ion or ation to each of the words below to make another word. Cross out the final e if you need to:

express_____	admire_____	transport_____
detect_____	operate_____	product_____
compute_____	radiate_____	protect_____

Write each of the words you made in one of the sentences below.

1. Harold could read aloud with good _____.
2. Carrying goods from one place to another is called _____.
3. Many forests are now under government _____.
4. One of the chief jobs of a forest ranger is the _____ of fires when they first start.
5. The _____ of an airplane calls for much practice.
6. The earth would be cold and lifeless without the _____ of the sun.
7. Omar looked upon Gomez with great _____.
8. Working out the answers to problems in *arithmetic* is called _____.
9. Automobile plants are turning out more cars than ever before. Their _____ is increasing.

Working with Additional Prefixes

Here are some additional prefixes and their meanings:

ex	out, out of, from	sub	under
im	not	super	over, above
inter	together; between; mutually	non	not

Write one of these prefixes before each of the words below to make the word mean the same thing as the definition to the right of it.

- | | |
|---|--|
| _____possible: not possible | _____plain: to bring out, make plain |
| _____port: to send out of the country | _____commercial: not commercial |
| _____change: to change mutually, put each in place of the other | _____way: an underground "way" or railroad |
| _____natural: above the forces of nature | _____weave: to weave threads together |
| _____merge: to place under | _____man: a man above the average |

DIVIDING WORDS INTO SYLLABLES

At your level you find many long words in your reading. These words not only have two or three syllables, but often they have four or five syllables. Nothing will help you more in pronouncing these long words than knowing sure ways of breaking them up into syllables.

Sounded and Silent Vowels

A syllable, as you know, is a word or a part of a word in which there is a *sounded* vowel. Unless the vowel is *sounded*, it doesn't make a syllable. You have learned that when two vowels come together in a word only one of them is sounded. You have also learned that when a single vowel is followed by final

e, the final e is not sounded. Knowing when vowels are sounded and when they are silent is important in dividing words into syllables.

Cross out the silent letters in each of the words below in which you find silent letters. Then answer the question in the two headings about each one.

	<i>How Many Sounded Vowels?</i>	<i>How Many Syllables?</i>		<i>How Many Sounded Vowels?</i>	<i>How Many Syllables?</i>
brake	_____	_____	remembering	_____	_____
increase	_____	_____	manufacture	_____	_____
forsaken	_____	_____	Babylonians	_____	_____

Guides for Syllabication

1. *Dividing between words in compound words.* Now that you have reviewed the effect that vowels have on syllables, you should be able to run through the guides to syllabication without difficulty. The easiest guide for dividing words, you will recall, is

divide between the words in a compound word.

Divide the compound words below by drawing a line between the words that form them. Practically all of the words in the syllabication exercises on these pages are in the next units of this book.

corkscrew	outskirts	downfall	vineyard
streamline	mankind	newsprint	withstand
cardboard	cornstalk	wallboard	lifetime
seedmen	farmland	outline	schoolroom
weekends	classroom	broadcast	background
airplane	drawback	daylight	elsewhere
offspring	textbook	breakdown	wholesale

2. *Dividing between double consonants.* Another easy guide is that when words contain double consonants (dd, ss, and so on), you usually divide between the double consonants. When you pronounce the word, remember that the consonant with the accented syllable is sounded, the other consonant is silent.*

Divide the words below by drawing a line between the double consonants. If one consonant is silent, cross it out. You know all of these words, so you shouldn't have any trouble deciding which syllable is accented.

horrid	common	attend	hottest
stabbing	connect	sorrow	effect
pressure	arrange	correct	supply
occur	happen	shabby	twitter
suggest	blossom	afford	differ
pollen	pattern	millar	follow

* Double c is an exception when the first c is pronounced as k in ask and the second c as s, in success.

3. *Dividing between two separately sounded consonants.* When two separately sounded consonants

member	custom
admire	furnish
center	quarter
signal	compare
Turkey	master

4. *Dividing before a single consonant.* When you come upon a single consonant between two vowel sounds, you usually divide just before the consonant. There are exceptions to this, but it usually holds.

meter	cider
local	crises
rotor	coupon
tunic	bonus
viper	result

5. *Considering consonant blends and speech sounds as single consonants.* Since a consonant blend or a speech sound is just *one* sound, it usually sticks together in a word. Treat a blend or a speech sound as if it were just one consonant. Guide 3, above,

hungry	author
describe	central
youngster	complain
microbe	explore
anthrax	purple

6. *Dividing between prefixes, root words, and suffixes.* Prefixes, root words, and suffixes are syllables or combinations of syllables in themselves. When syllabifying a word made up of these elements, you often divide between them. There are some exceptions to this guide. The root word sometimes gives a final consonant, especially *t*, to a suffix. The word *actor*, for instance, is divided ac tor because act or

heading	statement
between	active
action	enroll
spineless	porter
reform	judgment

come between two vowels, you usually divide between the consonants.

adjust	circuit
injure	doctor
number	entire
enjoy	section
condense	engine

Divide the words below by drawing a line before the single consonant that comes between two vowel sounds.

giraffe	bacon
salute	fable
fatal	protest
cadet	cobra
motor	direct

may be used with most words having blends or speech sounds, Guide 4 with others.

Divide the words below by drawing a line between the syllables. Treat each sound or blend as one consonant.

purchase	gather
triple	monster
restrain	response
complex	orchard
employ	farther

would be difficult to pronounce. Once you get a word broken into small enough parts so that you can test various ways of pronouncing it, you usually won't have any trouble finding exceptions.

Below are words made by combining root words with prefixes or suffixes. Divide each into syllables. Watch for exceptions.

driver	improve
ruthless	deform
careful	question
freedom	planter
amount	buzzing

Exceptions

When words end with le, ble, ple, gle, and similar forms, these formations are usually considered syllables even though they lack a sounded vowel. You divide between them and the rest of the word.

Divide the words below into syllables. Apply any of the guides that you have had just as you would if the final e were sounded.

able	people	tickle	pickle	tackle	huddle
battle	ripple	riddle	nozzle	puddle	rubble

FINDING CAUSES AND EFFECTS

In *geography* and *history* you frequently find selections that give information about causes which produced certain effects. You also find cause and effect selections in *science*. You should readily be able to identify cause and effect material. Once you find a paragraph or a series of paragraphs that deal

with a cause and its effect, then you should realize that there are two important things for you to do: (1) find the cause and (2) find the effect. With these two purposes in mind you should be able to read cause and effect material more rapidly and with better understanding.

Causes and Effects

In the paragraphs below causes are given which lead up to certain effects. Find the *cause* in each of the different selections and sum it up in a few words on the line following *Cause*. Then find the *effect* of the cause and sum it up in a few words on the line following *Effect*.

1. The difficult living conditions in forests had their effects upon the early settlements of man. Conditions in the true forest, stretching mile after mile without a break, are not conducive to easy living. Sunlight is captured by leaves a hundred feet above the forest floor. Water in the ground is used by the roots of the trees before it can rise to the topsoil. The grass that grazing animals need cannot grow in the dense forest. Neither grazing animals nor meat-eating animals can live there.

For this reason, early human life centered on open plains. Here there was grass for the grazing animals and meat for the meat-eating animals. Here man first learned to hunt, then to tame wild animals so that his "hunting" could be done at home. Here man learned to grow crops and build cities. All early civilizations—the Egyptian, Babylonian, and Phoenician in the Old World, the Inca and Aztec in the New World—developed on open plains too dry to support forests.

Cause: _____

Effect: _____

2. In starting to build the first civilizations on the plains, man developed tools. These tools made it possible for man to begin to live in parts of the forest open enough to support animals. Such primitive peoples as the American Indians made the woodland yield a living to them. With bows and arrows they killed animals which they used for food and clothing and covering for their tepees. With bark from trees they made canoes. Even at this primitive stage of culture, man was beginning to control forests.

Cause: _____

Effect: _____

3. Meanwhile, however, the civilizations that had developed on the plains were rapidly outgrowing the available open land. The wars that they had fought with one another had proved unsatisfactory as a way to get more land. Too often, the "winner" had found that he had spent lives and money only to add the hungry people of other nations to his own. Increased cropping and grazing had proved just as useless. Knowing little of fertilization and conservation, the ancient peoples had found the plains unable to carry the heavy burden placed upon them.

The result was that the plainsman began to clear the forest. Colonies were sent out to occupy empty forest land. Those forests already settled by more primitive people were either occupied by treaties or taken in warfare. The crude weapons brought by the forest-dwellers from the plains thousands of years before were no match for the weapons developed by civilization. Both Europe and America were deforested in this way.

Cause: _____

Effect: _____

4. The destruction of forests has far-reaching influences on soil. The roots of trees hold the soil together and keep it rather firmly packed. Under these conditions it doesn't wash away easily. Where hillside forests have been destroyed, we often find that the rich topsoil has been carried off by flood waters into streams and oceans. Only barren wasteland remains, because nothing will grow on land from which the topsoil has been washed.

In other places the burning of timber has ruined the land. When the leftover branches and waste lumber are burned, roots and seeds of plants are also destroyed. Without plants the soil soon becomes unproductive and useless.

Barren soil is perhaps one of the most serious results of destroying forests.

Cause: _____

Effect: _____

Sometimes the effect or effects are given first in a selection. Then the cause is discussed in explaining the effects. This is the case in the selections below. In reading each of these selections, first find and sum up the *effect*; then find and sum up the *cause*.

1. The Sahara region is now a great barren desert of shifting sands. It was not always so. Sahara was once a land of growing trees and running streams. Early records of the Egyptians tell of a forest in the center of the Sahara where buffalo and other animals lived. The remains of trees can still be found in old dried-up lakes and river beds.

The forests of the Sahara died because of the drier climate that resulted there when the last Ice Age ended. During the Ice Age, the Sahara was the place where cold air from frozen Europe met warm air from southern Africa. Rains resulted, and the moist climate made it possible for trees to grow. When the ice covering Europe melted, Europe became the place where cold air and warm air met. The Sahara dried up.

Effect: _____

Cause: _____

2. While it is true that no one lived in the forests at first, there came a time when even the industries moved into the forests. As man developed tools new industries sprang up, many of which required the use of heat. The smelting of metals, the manufacturing of glass, and the making of charcoal all required fires. Wood was the chief fuel used by such industries for many years. So we find that whole industries often moved into the forests. They had to have fuel, and so they located where wood was plentiful.

Effect: _____

Cause: _____

3. Quick thaws are very common during the winter months in southern British Columbia and Alberta. At such times there is a rapid rise in temperature, as much as sixty degrees within a few hours. The snow melts quickly, and water runs down the streets of the cities and towns as though it were spring.

The welcome change from the cold, snowy, winter weather is brought about by a wind called a Chinook. Blowing from the southwest, the warm, dry air sweeps down the eastern slopes of the Rocky Mountains, replacing the cooler winter air and melting the snow.

Some of the moisture is picked up by the dry wind, creating the impression in the fields that the snow is "eaten." Except for a few inches on the surface the ground remains frozen so that the melted snow runs off the land in a steady stream of water.

Effect: _____

Cause: _____

4. When Jack Miner settled on his farm in Kingsville, Ontario, he sprinkled feed on a small lake to encourage the wild ducks to land there. This was the beginning of a life's work in conservation and led to the establishment of his world famous bird sanctuary in 1904.

Miner developed an interest in birds very early in life, and he spent many hours watching them feed, build their nests, and raise their young. Here he learned that migrating birds often need a place where they can rest and be fed and protected in case of injury. The first few birds to use his sanctuary brought their young back the next year, and the numbers have grown annually until an estimated 30,000 birds now arrive each year. We have Jack Miner to thank for directing our attention to the need of bird conservation.

Effect: _____

Cause: _____

5. Jack Miner planned carefully for the operation and maintenance of a permanent bird sanctuary. During his years on the farm he provided feed for the birds and established a hospital where he could care for their injuries. He carefully banded their legs so that their migratory habits could be studied and their flights made safer.

In 1931 he formed the Jack Miner Migratory Bird Foundation, and the family donated the farm land and buildings for use in the conservation work. The Foundation received money annually from the provincial and federal governments and from citizens who knew of Miner's good work with the birds. Jack Miner, himself, traveled widely, lecturing and writing of the work in order to help support the sanctuary financially.

Effect: _____

Cause: _____

FACT OR OPINION?

It is important in all of your reading that you distinguish between fact and opinion or belief. Many articles appear to present facts at first glance. If you study them carefully, however, you will find that they only present the opinion or belief of some person or group of persons. In such cases you should not accept the information as final. Withhold your acceptance until you have further evidence that the statements are true.

There are some cues which help you to tell whether an article presents facts or opinions. Articles of opinion usually have such tell-tale phrases in them as: "It is said," "the theory is," "it is reported," "I

think," "they believed," "it is my opinion," "Mr. So-and-So claims," and so on. When you find such phrases, don't accept the information as facts. Perhaps your opinion is as good as that of the writer.

An article is apt to give facts if it contains figures or dates; if it is written by a scientist or other specialist in his field; if it is based on historical records; or if it is the report of our government or some authorized agency or committee.

Read the selections below. Decide whether each one gives facts or opinion. Place a check mark to show your decision after the question "Fact?" or the question "Opinion?"

1. Scientific studies show that the principal causes of soil erosion are the removal of timber, burning-over of land, breaking up the vegetative soil cover, cultivation of crops on steep slopes, and over-grazing of pasture land. As one writer has said, "First the axe, then the plough, then the rain, then erosion, finally the desert."

Fact? _____ Opinion? _____

2. Canada, which stretches from the Atlantic Ocean to the Pacific, and from the Arctic Islands more than halfway to the Equator, naturally has great variations in climate. Scientists think that the distribution of various kinds of trees reflects this. They suggest that when great changes in climate took place in the past, the distribution of Canadian trees changed along with the changing conditions. For example, when the great glaciers of the Ice Age moved southward, those species of trees which grew in the subarctic and north temperate zones were forced southward, and when the ice retreated they moved north again. It is believed that the present distribution of differing species, such as evergreen, can be explained in this way.

Fact? _____ Opinion? _____

3. The science of forestry is a young science, but it has already made much progress.

Among other things forest scientists have studied the temperature of forests. They have found that the temperature of trunks, branches, and twigs of trees is always lower than the temperature of surrounding air. This difference causes dew to form on the branches. The difference in temperature also causes air currents to move out over neighboring fields and back again. These movements in turn help dew and fog to form

over these fields. This fog helps to protect crops from hail in summer. A company that insured against hail collected data concerning hailstorms for a period of twenty years. Their data show that regions without forests have hailstorms much more frequently than regions that have forests.

Fact? _____ Opinion? _____

4. Many people believe that forests shape character. The task of making homes in the vast wilderness was almost superhuman. The settlers were courageous, determined, energetic, and willing to work hard. They had no tractors or powder for blasting out stumps. Every tree had to be felled by hand with an axe or saw. Sometimes they used fire for clearing the land, but this had to be used carefully. All too frequently a sudden wind turned a small fire into a raging conflagration which burned all before it. Few settlers realized what would happen when they had cleared off all trees. Today many people judge the worth of a farmer by the woodlot round his farm.

Fact? _____ Opinion? _____

5. "It is my opinion," said Mr. Stone, "that Thomas Burrows is the best man for the office. I have known him for many years and have always found him to be strictly honest in all of his dealings. I believe that he is genuinely interested in the welfare of our city, and that he will do great good for the city and for the people who live in it. His service in the war was noteworthy, and he has had considerable experience in public office. Everyone likes and respects him. He has the best of judgment and the courage to use it. I consider him to be far superior to his opponent, and I most strongly recommend that you vote for him."

Fact? _____ Opinion? _____

INCREASING YOUR SCIENCE VOCABULARY

The words below are among those that appear most often in *science* books at your level. You will meet these words very frequently in your reading both in and out of school.

Study the pronunciation of each word to make sure that you know how to pronounce it correctly. Say each word to yourself, pronouncing it distinctly. Then read the meaning of the word and think about it.

acoustics á kōōs'tiks	A science dealing with sound.
allergy ǎl'ēr jī	A bad reaction which some people have to pollen, dust, or certain foods.
asteroid ǎs'tēr oid	One of many small planets found between Mars and Jupiter.
astigmatism á stig'má tiz'm	A defect whereby the eye does not see with equal clearness in all directions.
carnivorous kār nīv'ō rūs	Flesh-eating; feeding on animals as opposed to feeding on vegetables.
chlorination klō'rī nǎ'shŭn	Treating water with chlorine to kill germs.
combustible kōm būs'tī b'l	Apt to catch fire.
condensation kōn'dēn sā'shŭn	A change from a gas to a liquid.
conglomerate kōn glōm'ēr ĭt	In geology, a rock formed of pebbles cemented with hardened clay.
cyclotron sī'klō trōn	An instrument used to transform atoms.
detergent dē tūr'jēnt	A substance used in cleaning.
diffusion dī fū'zhŭn	The process in which two substances or qualities intermingle.
distillation dīs'tī lǎ'shŭn	The process of driving off gas or vapor from liquids or solids.
enzyme ēn'zīm	A substance in the saliva, stomach, or intestine which aids digestion and other body processes.
epidermis ēp'ī dūr'mīs	The outer layer of the skin.

Choose one of the words in the column to the left to complete the meaning of each of the sentences below. Write the word in the blank space where it belongs.

- Mrs. Jones sneezed whenever she breathed the pollen of goldenrod. She had an _____.
- Tom scratched his hand. But the cut was not deep. It only went through the _____.
- Mr. Wood had to get eyeglasses to correct his _____.
- You can smell an open bottle of ammonia because there is a _____ of ammonia particles into the air.
- Some people think there should be _____ of drinking water. Others think that this would have harmful effects.
- A _____ is an "atom smasher."
- The process of boiling water to get vapor which is free from germs is called _____.
- Rain results from the _____ of water vapor into small drops of water which fall from the clouds.
- Tom found a rock in which pebbles were cemented by hardened clay. It was a _____.
- Gasoline is highly _____.
- If a space ship tried to fly to Jupiter, it might pass near an _____.
- Better hearing aids have resulted from modern _____.
- Mrs. Stevens used a _____ in doing the family washing. She thought it was very effective in getting the clothes clean.
- One of the most useful substances in aiding digestion is the _____.
- Lions, tigers, and leopards are _____ animals. They do not care for vegetables at all. They feed on other animals.

UNIT FOUR

THE AUTOMOBILE: ITS BENEFITS AND DANGERS



Have you ever been in a car when the brakes failed? Let's hope that you haven't, for this is a very frightening experience.

Read the story below to find out what happened to one boy and his father when the brakes in their car failed.

Time yourself in reading the story.

Beginning time: Hr. _____ Min. _____ Sec. _____

NO BRAKES*

It was small. Yet it was dangerous. It lay on the deserted mountain road—a sharply edged rock that the recent rains had washed down from the mountains. The green car swinging around the blind curve had no time to swerve clear. Ted Brown, sitting alongside his father, heard only a slight scraping noise as the car passed over the jagged rock. Thankful that they had escaped unharmed, he sighed in relief.

“That was lucky, Dad. It had me worried for a moment. I . . .”

He stopped. Something was wrong. Horribly wrong. He felt a quick coldness cramp his stomach as he caught the expression on his father's face. The jaw muscles were corded and the lips were set in a tight thin line.

“Dad!” he cried. “What is it?”

It was the wind that told him. The wind that increased and sang through the open windows as the car gathered speed. He saw his father's foot even with the floor where it pressed on the brake-pedal. Then he knew for certain. The brakes were not holding!

* Adapted from a story written for this book by William McKellar.

The car thundered down the narrow road, the towering face of the mountain on the left, the yawning depths of the valley to the right. Ted could see his father's foot frantically pumping at the foot pedal. He could see, too, that although his left hand had yanked up the emergency brake, the speed of the car was in no way lessened. They were helpless in a runaway car rushing down a mountain road!

Ted's father fought the wheel with all the skill he had developed during a lifetime of driving. His face was a frozen mask as he threaded the car through the winding mountain road. The knuckles of his right hand stood out white and bony as they strained against the wheel. His left hand gripped the emergency brake so fiercely that the skin was sandpapered off.

Once his father yelled something, but Ted could not hear him for the screaming of the wind. And always back of his mind was the icy fear that around the next bend of the corkscrew road they would meet an oncoming car. If that happened, it would be the end, for they needed every inch of the narrow road to keep from sliding off into the fearsome gorge that yawned alongside them.

dislodged (dis löjd'): Having been moved from a resting place.
swerve (swûrv): To move from a straight line or course.
yawning (yôn'ing): Opening wide.
frantically (frăn'ti kăl i): Wildly; greatly moved with rage or emotion.
realize (rê'äl iz): To recognize something as real.

emergency (ê mùr'jën sî): An unforeseen situation which calls for immediate action.
dreariest (drêr'î êst): Gloomiest, most dismal, most cheerless.
gorge (gôrj): A ravine with steep, rocky walls.
roughest (rûf'êst): Most uneven.
horribly (hôr'î b'li): Terribly, shockingly, dreadfully.

They streaked down a long straight stretch of road before Ted saw the savage turn that awaited them dead ahead. They would never make it! His heart leapt to his throat and stifled his cry of alarm as his father spun the wheel. The next second he felt himself flying through space. Then a sudden darkness blotted out everything.

When he came to, it was to find himself lying on a patch of nettles on a narrow shelf that jutted out from the side of the road. His father was bending over him, and a wave of relief swept through Ted when he realized that they were both alive.

"The car's down there," the older man said grimly, indicating the steep cliff. "By some miracle we were both thrown clear. However, we're not out of the woods yet. My left ankle is badly sprained, and I can't walk. Do you feel able to walk? Do you think you can get down to the village for help?"

Ted nodded and struggled to his feet. His head was spinning, and, although he had suffered no serious injury, his body seemed filled with stabbing little jolts of pain.

"Sure thing, Dad," he said gamely. "I'm all right. I'll be right back."

It had been easier said than done. It seemed to Ted that he had been walking for hours without seeing a sign of life. Surely this must be the loneliest, dreariest, most forsaken spot in the world! And the hottest, he reminded himself as the sun burned down on his shoulders. His strength was almost spent when he stumbled into a garage on the outskirts of a tiny cluster of houses and panted out his story. In a matter of minutes a rescue party was on its way to bring his father safely down the mountain.

"Well, Ted," said his father later that night as they sat on the porch of the doctor's house, "how does it feel to be a hero?"

Ted stared. "I'm no hero!"

"You certainly are. Everyone says so. You were badly shaken up in the crash yet you managed to walk ten miles over the roughest country in America to get help." He paused and looked proudly at Ted. "It's nice having a hero for a son."

Ted smiled no less proudly at his father. He was remembering the way his father had brought the car down the mountain.

"It's nicer having one for a father," he said simply.

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:			

No. words $\frac{800}{\text{No. seconds}} \times 60 = \text{_____WPM}$

COMPREHENSION QUESTIONS

- 1. What happened in the first place that caused the trouble?

- 2. What was wrong with the car?

- 3. What was on the left and what was on the right of Ted and his father as the car ran downhill?

- 4. What did Ted fear would happen as the car ran away?

- 5. How did the car happen to go over the cliff?

- 6. Why didn't Ted's father go to the village for help?

- 7. How far did Ted have to walk to get help?

- 8. Where did he finally find help to rescue his father?

9. How did Ted's father show admiration for his son?

10. How did Ted show admiration for his father?

Comprehension score: _____ Rate: WPM _____

DISCUSSION QUESTIONS

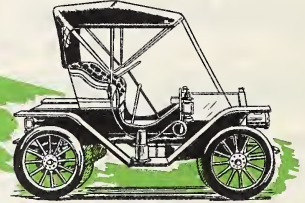
You have read about four boys who had exciting experiences. Check the names that you think are the best answers to the questions.

- 1. Which boys changed their attitude as a result of their experiences?
Omar Gomez Jim Ted
- 2. Which boy do you think used his wits to the best advantage in helping to meet danger?
Omar Gomez Jim Ted
- 3. Which one do you think underwent the greatest test of physical strength?
Omar Gomez Jim Ted
- 4. Which one did you admire the most?
Omar Gomez Jim Ted

THE COMING OF THE AUTOMOBILE



Here is a picture of the assembly line in one of our great automobile plants at the present time. The small picture shows the first McLaughlin-Buick built in 1907 in Oshawa, Ontario.



After studying these pictures give your own reason for the rapid growth of the automobile industry: —

The story that you just read told about the thrilling experience that Ted had when the brakes failed in his father's car. A car can be a very dangerous thing. On the other hand, it can be the means of making life much more convenient and pleasant.

Read the selection below to find out how we happen to have automobiles, and what changes automobiles have made in our lives.

1. There are no boldface headings to tell you the topics of different sections of this selection. So, first of all glance through the entire selection in search of the main idea in each paragraph. When you have

found the main idea, underline it and think about it.

2. Next, read the entire selection carefully. Each paragraph tells about something that happened in connection with the development of the automobile industry. When things happen there is always a cause. Look for the cause in each paragraph as you read.

3. In paragraph 2 you are told about the industry at the beginning and now. In paragraphs 4 and 5 you are told about life before and after the invention of the automobile. As you read these paragraphs, think carefully about the differences that are mentioned.

4. Because you will be searching for causes and looking carefully for contrasts as you read, it would be better not to try speed-reading while working with this selection.

GROWTH OF THE AUTOMOBILE INDUSTRY *

1. The history of the automobile in America is a fascinating one. The "horseless carriage" came into our midst because of man's desire to find an easier and quicker way of traveling over roadways. Men in Europe are credited with the isolation of the principles and the practical development of motor vehicles up to 1892. Since then the automobile industry in the United States has made many important contributions. The first gasoline automobile was invented there by Charles Duryea and in 1903 Henry Ford

began producing cars on a large scale. In 1907 the first all Canadian Motor Car Co., McLaughlin's (now General Motors of Canada) was formed in Oshawa, Ontario.

2. The past fifty years have seen the automobile industry move forward with remarkable strides. Once only the rich could have a car. Now almost every Canadian family has one. In fact, many families have two or more cars. The car that sold for \$2,000 thirty-five years ago offered little to the owner in beauty, comfort, or speed. Today's car in the same price range has shiny chrome, streamlined shape, satinsmooth riding, and high speeds. The remarkable

* Adapted from material prepared for this book by Edward Kalevzon.

convenient (kǒn vĕn'yĕnt): Suited to one's comfort.
pedestrian (pĕ dĕs'tri ān): One who travels on foot.
fascinating (fās'ī nāt'ing): Gripping the attention.
Charles and Frank Duryea (dōōr'yā): Inventors of an early automobile.
manufacturing (mān'ū fāk'tūr ing): The process of making raw materials into useful forms by hand or machinery.

destruction (dĕ strūk'shŭn): Act of tearing down or destroying.
equipment (ĕ kwip'mĕnt): Materials and articles needed in an outfit.
remarkable (rĕ mār'kă b'l): Worthy of being noticed.
employment (ĕm ploī'mĕnt): Work for which one is paid.
amusement (ā mŭz'mĕnt): Entertainment.
recreation (rĕk'rĕ ā'shŭn): Play, refreshment from toil.

progress in building automobiles and highways has been chiefly responsible for Canadians owning about one car for every 4.5 people in Canada.

3. In recent years the automobile industry has become the largest single manufacturing industry in our country. Because of its rapid growth, the industry has given work to thousands and thousands of people. Many working people find employment in producing, selling, or taking care of cars. Then there are thousands of other people who produce things needed by the industry. Many oilfield laborers, tire makers, and steel workers are kept busy producing things which the automobile manufacturer must have.

4. Life was quite different before 1900 from life today. This difference was largely due to slow methods of transportation over country roads. Farmers and their families lived mostly by themselves. Food had to be stored for the winter months when it was not possible to travel over the snow-covered, rutted dirt highways. In times of sickness it was very difficult to get a doctor. Fire could burn a barn to the ground before a fire engine could get to the building. A thief could steal and be on his way before policemen could reach the scene of the crime. Most people spent their evenings, weekends, and vacations at home. It took too long to drive a horse to a town, the beach, or an amusement park.

5. Life is much pleasanter and more convenient to-

day. Farmers can travel to large towns or cities in a short time. People living in cities can depend upon swift-moving trucks to bring them fresh vegetables and dairy products from the distant farms. Doctors can quickly reach patients who are ill. Fire fighting equipment can be rushed quickly to the scene of a fire. All of us can expect police protection in a matter of minutes because of the speed of the automobile. In addition, parents and children, riding in the family car, can get to town, country, shore, or amusement park quickly and have time left to enjoy their recreation. All of this has come to pass because we now have automobiles which shorten the time it takes to travel from one place to another.

6. Although the automobile means much to 18,000,000 Canadians, it can bring sorrow and destruction. In a recent year automobiles killed 3,283 and injured more than 90,186 persons. Most of these accidents were caused by reckless drivers and careless pedestrians. Fewer than one accident in ten is caused by a defect in an automobile. High speeds, incorrect signals, and reckless driving cause most accidents. Careless walking when crossing streets also causes many accidents. The careful driver obeys traffic and speed laws, is thoughtful of others, and keeps his brakes, steering equipment, tires, and lights in good working condition. The careful pedestrian looks before crossing the street and does not try to race an automobile.

ACTIVITY 1—WRITING MAIN IDEAS

Write the main idea of each of the six paragraphs in order:

- 1. _____
- 2. _____
- 3. _____

- 4. _____
- 5. _____
- 6. _____

Does this list give a fairly good summary of the article? Can you restate the list of main ideas without looking at the sentences you just wrote? _____

ACTIVITY 2—MAKING CONTRASTS

Contrast life before the use of the automobile and afterward in regard to the topics below.

	<i>Before</i>	<i>After</i>
Food	_____	_____
Sickness	_____	_____
Fires	_____	_____
Recreation	_____	_____

WHY DID THE BRAKES FAIL?

You have read that most automobile accidents are caused by careless drivers. Ted's father, however, was a very careful driver. Yet he had an accident. His accident was caused by brakes that failed to work. What happened to the brakes? Why did they fail?

The selection below will answer these questions.

This selection describes some of the processes which take place when a car is running. You will frequently meet material in your *science* books in which processes are described. This pattern of *science* material is the most difficult pattern to read. The procedure below has been found helpful in reading such material.

1. First, read the boldface headings to find out what topics are discussed in the selection.
2. Study the diagram. Notice especially the parts

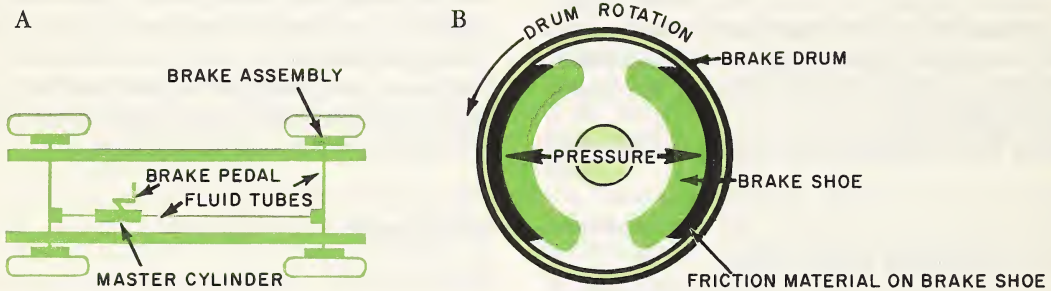
that are labeled and associate names with parts.

3. Read the first section to find the answer to the question, "How Do the Brakes Work?" In working with this section, read just one sentence at a time. If it mentions something shown in the diagram, look back at the diagram after reading the sentence. When you are sure that you understand that sentence, read the next one in the same way. Stop and think about each sentence to make sure the meaning is clear to you.

When you have finished the entire section, see if you can give the explanation to yourself in your own words. If not, go back and reread the parts that you need in making your explanation complete.

4. All remaining sections describe processes, except one which states causes and effects. All of the sections call for exact, careful reading.

THINGS TO KNOW ABOUT YOUR CAR



The Braking System of an Automobile

How Do Brakes Work? In Diagram A above you can see the four wheels of a car, and the mechanism within the car which causes the brakes in the wheels to act. In Diagram B you can see the brake mechanism inside of an automobile wheel.

The system of braking depends on tubes filled with a fluid. Notice the fluid tubes in Diagram A.

When a driver wishes to stop his car, he places his foot on the brake pedal. The brake pedal is fastened to a master cylinder. When this brake pedal is pressed down, it pushes on the piston in the master cylinder. This piston in turn forces fluid through

the fluid tubes to a cylinder in each of the four wheels. The pressure of the liquid is equal in the cylinders of all four wheels.

When the liquid reaches the cylinder in a wheel, it places pressure upon the brake shoes. The brake shoes are forced apart and against the brake drum. This pressure stops the wheel from turning.

What Causes Brakes to Fail? It is very important that the braking system of a car be kept in good condition. Sometimes the linings on the brake shoes become worn, and they have to be relined. Sometimes the brake shoes are not adjusted to pull up tight

explanation (ĕks'plā nā'shŭn): Process of explaining.

visualize (vīzh'ù āl īz): To see a mental picture.

mechanism (mĕk'ā nīz'm): The parts of a machine taken together.

fluid (flŭō'id): A liquid or gas; something that flows.

cylinder (sil'in dĕr): A chamber in a machine in which a piston is moved by pressure.

effectively (ĕ fĕk'tiv li): With power to produce a desired result; efficiently.

carburetor (kār'bù rā'tĕr): A mechanism used for mixing gasoline with air in an automobile.

explosion (ĕks plō'zhŭn): A sudden release of pressure; rapid combustion, usually accompanied by a loud report.

distributor (dīs trib'ù tĕr): A device for spreading the spark to spark plugs in an automobile.

generator (jĕn'ĕr ā'tĕr): A machine which produces electricity.

ammeter (ām'mĕ'tĕr): An instrument for measuring electric current.

enough against the drums. Sometimes the master cylinder or the brake cylinders in the wheels are not working effectively.

Then there may be a leak in the fluid tubes. If the brake fluid leaks out, there can be no pressure in the brake cylinders of the wheels. This is what happened to Mr. Brown's car. When the car scraped over the sharp jagged rock, it cut a small hole in one of the fluid tubes. Because the fluid leaked out, the brakes no longer worked.

What Is the Job of the Carburetor? The carburetor is one of the most important parts of a car. Liquid gasoline from the tank flows into the carburetor. Here gasoline is mixed with air to make the explosive vapor which passes into the cylinders of the engine, where it burns. The carburetor has special devices for feeding the right mixture at high speeds and low speeds. The carburetor should be kept clean so that it will not become clogged with dirt.

What Is the Job of Spark Plugs and Distributor? The spark plugs supply the sparks which explode the gas and air mixture in the engine cylinders. The

explosion results in a great pressure. This pressure pushes against the pistons and makes the car go.

The distributor and its points distribute the sparks. The points are so arranged that the sparks reach each cylinder at just the right time.

The spark plugs and the distributor should be kept clean and set correctly.

What Is the Source and Work of Electricity? Electricity is necessary in running a car. The battery and generator furnish this electricity. The electricity is carried by wires to the spark plugs. It causes the spark which explodes the gas. Electricity also is carried to the lights, the cigarette lighter, the horn, the radio, and so forth. It is this electricity that makes all of these things work. Electricity from the battery is used mostly in starting the car. The generator supplies electricity while the car is running. The ammeter on the instrument board tells whether or not the generator is charging. If it shows that the generator is not charging, this means something is wrong. The driver should find out what the trouble is and have it taken care of at once.

ACTIVITY 1—EXPLAINING A PROCESS

A. List the steps in the process of stopping a car:

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____

B. Explain in your own words the use of the carburetor:

C. Explain in your own words the work of spark plugs:

ACTIVITY 2—CAUSE AND EFFECT QUESTIONS

A. What are the chief causes of brake failure?

- 1. _____
- 2. _____
- 3. _____
- 4. _____

B. What was the cause of the accident which Ted and his father had? _____

C. How might Mr. Brown have avoided the accident he had: (You'll have to *think* to answer this question.)

Applying What You Have Learned About Reading Science Material

When you begin to read a new section in a *science* book, glance over the material to see what pattern it is. If it tells how things work, or describes processes, then plan to do slow, careful reading. Read and think about one sentence at a time, looking often at the diagram if there is one. When you have fin-

ished reading about one process, try to give the explanation to yourself. Then go on with careful reading of the next process and so on.

Listing the steps or writing a short explanation helps you to get a clear grasp of a process, and to remember it.

SOME NUMBER FACTS ABOUT AUTOMOBILES

In the last two selections you read about some of the causes of automobile accidents, and the need for great care in driving a car and keeping it in good condition. You will appreciate these needs still more deeply after working with the problems below.

You have had practice in using several *reading* skills necessary for studying problems. Now you are ready to have special practice in the fifth step: (5) Estimating the answer.

If you estimate the answer of a problem before computing it, and your estimate seems reasonable, then you can be fairly sure that you have made the right decisions about what to find, facts given, and processes to use.

When estimating problems in which you add, subtract, multiply, or divide, you can use round numbers in estimating answers.

Suppose you wanted to multiply 1,909 by 31. 1,909 is about 1,900 and 31 is about 30. So in estimating you might think in terms of $1,900 \times 30$ or 57,000.

Study these examples.

641 rounded to the nearest ten = 640

746 rounded to the nearest ten = 750

2,376 rounded to the nearest hundred = 2,400

13,224 rounded to the nearest hundred = 13,200

21,386 rounded to the nearest thousand = 21,000

231,642 rounded to the nearest thousand = 232,000

Read and, if necessary, reread each of the problems below to get the information that you need to place under the headings *To Find*, *Facts*, and *Processes*. Then estimate your answer and place that under the heading *Estimate*.

After making your estimate, ask yourself, "Is this *reasonable*? Could it be about that much?" If so, go ahead and compute the problem. If not, read and think the problem through again and make another estimate.

In working with these two pages you should compute each problem on a separate piece of paper as soon as you have made the estimate. Then compare your estimate with your computed answer to see how near you came to estimating the answer correctly.

PROBLEMS ABOUT AUTOMOBILES*

1. A recent poll taken in one city revealed that 72, or 12%, of the families interviewed owned a second car. How many families must have been included in the total poll?

To Find

Facts

Process

Estimate

2. In 1920 there were 407,064 motor vehicles registered in Canada; in 1960 there were 5,256,341. Express the comparison of the 1920 total with that of 1960 as a per cent.

To Find

Facts

Process

Estimate

3. Canadian registered trucks traveled 6,400,000,000 miles during 1960, and 34% of the mileage was accounted for by private intercity trucks. How many miles (to the nearest million) were covered by private intercity trucks?

To Find

Facts

Process

Estimate

4. If there were 888,475 trucks registered in Canada in 1959 and there was an increase of 2.3% the following year, what was the approximate total truck registration in 1960?

<i>To Find</i>	<i>Facts</i>	<i>Processes</i>	<i>Estimate</i>
----------------	--------------	------------------	-----------------

5. The total length of the Trans-Canada Highway is 4,859 miles; 1,453 miles lie within the province of Ontario. Express the mileage in Ontario as a per cent of the total.

<i>To Find</i>	<i>Facts</i>	<i>Process</i>	<i>Estimate</i>
----------------	--------------	----------------	-----------------

6. What per cent of auto accident deaths occurred on the Sundays of a given year if 12.3% occurred on Mondays, 10.3% on Tuesdays, 11.1% on Wednesdays, 11.5% on Thursdays, 15.4% on Fridays, and 21.0% on Saturdays?

<i>To Find</i>	<i>Facts</i>	<i>Processes</i>	<i>Estimate</i>
----------------	--------------	------------------	-----------------

7. If in the year reported in Problem 6 there were 3,619 auto accident deaths, how many of these deaths occurred on Saturday–Sunday weekends?

<i>To Find</i>	<i>Facts</i>	<i>Processes</i>	<i>Estimate</i>
----------------	--------------	------------------	-----------------

8. According to a recent report, between January, 1955, and July, 1960, there were 5,431 road deaths in a certain province; collisions between motor vehicles and pedestrians accounted for 1,746 of these. Express this greatest single cause of fatalities as a per cent.

<i>To Find</i>	<i>Facts</i>	<i>Process</i>	<i>Estimate</i>
----------------	--------------	----------------	-----------------

9. In the same period, 7,575 drivers were involved in fatal accidents; 18.8% of these drivers were between the ages of 20 and 24. How many drivers between the ages of 20 and 24 were involved in fatal accidents?

<i>To Find</i>	<i>Facts</i>	<i>Processes</i>	<i>Estimate</i>
----------------	--------------	------------------	-----------------

10. In 1960 the consumption of gasoline in Canada totalled 3,017 million gallons, an increase of 5.3% over the previous year. What was the total consumption of gasoline in 1959?

<i>To Find</i>	<i>Facts</i>	<i>Process</i>	<i>Estimate</i>
----------------	--------------	----------------	-----------------

Applying What You Have Learned About Reading Problems

In working with problems in a *mathematics* book it is advisable always to estimate your answer before computing the problem. If your estimated answer seems reasonable, then your reading for meaning has probably been correct.

When a problem seems difficult to you, write the four headings on a separate piece of paper: *To Find*,

Facts, *Process*, *Estimate*. Then read and reread the problem until you find the necessary information to place under each heading. Take plenty of time to find what you need to place under these headings, and the most of your work will be done. You can do the computation quickly once you know what to do in order to solve the problem.

DIVIDING WORDS INTO SYLLABLES

You have had practice in using six guides for dividing words into syllables. See how quickly you can apply these guides in the exercises below and on the next page. All of the words used in the exercises are found in selections that you will soon read.

Guide 1

To divide a compound word, you divide between the words that make up the compound word.

Divide the compound words below by drawing a line between the shorter words that form each one.

millrace	sportsman	freshman	smallpox	windmill
handbook	northeast	boathouse	silkworm	sandbag
crossbred	headache	classmate	salesman	lightweight

Guide 2

When a word contains double consonants, you usually divide between the double consonants.

Divide the words below according to the guide.

approve	suppose	follow	summon	accept
mammoth	billow	vaccine	sodden	accent
trapping	message	manner	collect	coffee

Guide 3

When two separately sounded consonants come between two sounded vowels, you usually divide between the consonants.

Divide the words below according to the guide.

cluster	welfare	contact	cactus	marvel
Burbank	circuit	public	stigma	wisdom
Mendel	purpose	contain	campaign	carbon
molten	concern	ultra	culture	organ

Guide 4

When a single consonant comes between two vowel sounds, you usually divide just before the consonant.

Divide the words below according to the guide.

adult	token	lava	region	famous
detail	climate	defense	decay	David
private	deny	Poland	produce	patience
student	select	label	future	Roman

Guide 5

To divide a word with a consonant blend or speech sound, you usually treat the blend or speech sound as one consonant.

If the blend or sound appears between two vowels, you usually divide before it. If the blend or speech sound appears with a separately sounded consonant, you usually divide between the blend or speech sound and the consonant.

Divide the words below into syllables.

fragrant	reflect	surprise	phosphor	display
secret	program	athlete	substance	comply
machine	father	subscribe	exchange	compress
progress	improve	congregation	tungsten	Webster

Guide 6

Words made up of root words, prefixes, and suffixes are usually divided between the root words, prefixes, and suffixes.

In applying this guide to the words below, remember that a root word sometimes gives its final consonant, especially t, to a suffix.

treatment	dullness	slighting	dwarfness	decamp
acreage	thoughtless	freedom	workable	subhead
denote	engulf	inept	rawness	react
striking	unfair	sweeten	section	action
statement	misjudge	private	speedy	seedling
discover	boldness	inbred	northern	enfold
heedless	resell	replant	farmer	insight

Exceptions

When words end in dle, ble, cle, ple, and similar formations, these formations are considered syllables even though they do not contain a sounded vowel.

Divide the words below according to the exception. Apply any of the guides that you have had just as you would if the final e were sounded.

ladle	supple	title	throttle	ample
struggle	pile	baffle	smuggle	brittle
dazzle	bundle	tremble	scramble	crackle

Applying All Your Aids to Syllabication

Divide each of the words below. Then place a number on the line at the left of the word, to show which of the guides you have used in deciding where to divide the word. If two guides apply to the same word, write both numbers before the word. Refer to the numbered guides when necessary. For the exceptions with le and so forth, write E.

_____romance	_____daisy	_____perform	_____boldface
_____typhoid	_____walnut	_____doctor	_____endear
_____shortage	_____astound	_____spineless	_____further
_____useful	_____single	_____adjust	_____lifetime
_____compass	_____current	_____recess	_____mankind
_____Betsy	_____coolly	_____dwarfness	_____leghorn
_____pillow	_____complain	_____Timmy	_____adjust
_____pamphlet	_____boathouse	_____mingle	_____collect
_____judgment	_____couple	_____prefer	_____inland
_____inject	_____healing	_____vessel	_____immune
_____slantwise	_____vaccine	_____serum	_____fewest
_____statement	_____label	_____decrease	_____yardstick

WORKING WITH WORDS HAVING SIMILAR MEANINGS

In each of the groups below there is one word together with three spaces on which additional words may be written. The additional words for each group are to be words that have meanings somewhat

like the key word which has already been printed in the group.

Choose the three additional words for each group from the lists at the bottom of the page.

reckless _____ _____ _____ _____ _____	relief _____ _____ _____ _____ _____
grip _____ _____ _____ _____ _____	conclusion _____ _____ _____ _____ _____
dreary _____ _____ _____ _____ _____	knowledge _____ _____ _____ _____ _____
certain _____ _____ _____ _____ _____	responsible _____ _____ _____ _____ _____
serious _____ _____ _____ _____ _____	vivid _____ _____ _____ _____ _____
convenient _____ _____ _____ _____ _____	marvelous _____ _____ _____ _____ _____
connect _____ _____ _____ _____ _____	device _____ _____ _____ _____ _____

- | | | | |
|----------------|------------|-------------|-------------|
| grave | wondrous | astonishing | undeniable |
| striking | result | information | help |
| trustworthy | answerable | outcome | dull |
| wisdom | aid | undoubted | thoughtless |
| grasp | cheerless | careless | finish |
| solemn | clutch | distinct | learning |
| unquestionable | clear | suitable | incredible |
| clasp | liable | easement | handy |
| heedless | depressing | important | adapted |
| join | link | tool | invention |
| | instrument | unite | |

WORKING WITH WORDS OPPOSITE IN MEANING

Below you will find two lists of words. To the right of each word there is a line. On this line you are to write a word which is opposite in meaning to the printed word at the left. You will find the right

word to write on each line in the list at the bottom of the page.

The word which is opposite in meaning to the first word has been written for you.

approve disapprove
 future _____
 ignore _____
 recent _____
 contempt _____
 desert _____
 shallow _____
 irritate _____
 purchase _____
 modest _____
 recall _____
 foreign _____
 absent _____
 protect _____
 despair _____
 avoid _____
 release _____
 fail _____

frantic _____
 compare _____
 appear _____
 complete _____
 fluid _____
 clogged _____
 source _____
 patience _____
 common _____
 advantage _____
 inferior _____
 opposite _____
 initial _____
 miserable _____
 mammoth _____
 valuable _____
 evaporate _____
 intense _____

bold	soothe	heed	disadvantage
oasis	past	calm	harm
forget	domestic	impatience	end
disapprove	unusual	superior	incomplete
restrain	solid	deep	undertake
final	similar	esteem	condense
contrast	sell	hope	clear
succeed	old	worthless	disappear
present	comfortable	tiny	slight

READING FOR DETAILS

You read for many different purposes, and you use different procedures according to your purpose. If you are reading simply to get the general ideas about a topic, you may search for main ideas only. If you read to get all of the detailed facts about a subject, then you use a different procedure.

In reading for details you still look for main ideas. That is your first step. Then after finding each main idea, you look for the cluster of details that go with it. The author states each main idea, then he expands upon it, giving you more facts about this main idea. It is helpful to think of the main idea in a

paragraph as a little topic in itself, and the details as the additional information which the author gives you about this topic. Think of the main ideas as the stem of a bunch of grapes, and the details as the grapes that cluster about the stem.

Read the paragraph below. Underline the main idea. Then read the additional information given about this main idea, and think of each detail as it relates to the main idea. The main idea, along with its cluster of details, is worked out for you in outline form. Study this outline carefully. You will soon outline paragraphs yourself.

The idea of inventing a "horseless carriage" is not new. Sir Isaac Newton suggested it over 200 years ago. In 1769 Nicholas Cugnot, a Frenchman, built a steam vehicle that some call the first automobile. In 1836 Thomas Davenport, an American, designed an electric car. In 1885 Gottlieb Daimler, a German, introduced the first successful gasoline auto engine.

Main idea: Idea of "horseless carriage" is not new.

Details: A. Newton suggested it over 200 years ago.
B. In 1769, Cugnot built first auto.
C. In 1836, Davenport designed electric car.
D. In 1885, Daimler introduced successful gasoline auto engine.

Here is another paragraph on the history of the automobile. Find the main idea of the paragraph and write it in the outline below. Then find each important detail that tells more about the main idea. Write each of these details in the outline. Write both the main idea and details in as few words as possible. Leave out unimportant words. State nouns, verbs, and important phrases only.

Several groups should be given credit for building the first automobiles in Canada. The Dixon Carriage Works of Toronto, Ontario, built an electric car in 1893, the first motor vehicle in Canada. The Ford Motor Company of Canada produced 117 cars for the market during 1905. Two years later, Robert McLaughlin and his son formed the McLaughlin Motor Car Company in Oshawa, now General Motors of Canada. In 1908 the Everitt-Metzger-Flanders Company built an assembly plant at Windsor, merging three years later with the Studebaker Company. In 1925 the Chrysler Corporation was formed at Windsor.

Main idea: _____

Details: A. _____

B. _____

C. _____

D. _____

E. _____

Read the selection below for details. Write the main idea in each paragraph, and then write the details which tell more about the main idea. Use a separate piece of paper in outlining paragraph 4.

1. Henry Ford was interested in mechanical things from his early years. He was born near Dearborn, Michigan, on July 30, 1863. As a child he helped his father with the general farm work, but he especially liked working with machinery, and tinkering with watches and clocks. He often did repair work without pay.

2. He made many sacrifices because of this interest in mechanics. When he was 16 years old, he walked to Detroit and hired himself out to a mechanic at a salary of \$2.50 per week. His room and board came to \$3.50. In order to get the extra money, he worked four hours every night for a watchmaker at \$2.00 a week. Later he worked at an engine shop, where he set up steam engines. Finally, he became an engineer at the Detroit Edison Company.

3. Ford organized a company to manufacture automobiles in 1903. This company was known as the Ford Motor Company. The capital of this company was supposed to be \$600,000 but only \$28,000 was actually subscribed. This amount came from stockholders made up of Ford's neighbors and friends. One of the stockholders who subscribed \$2,500 in Ford's company sold his shares back to Ford in 1919 for \$30,000,000.

4. Ford's greatest contribution was that he promoted mass production in the auto industry. He standardized every part of the automobile so that it could be turned out quickly in great quantities. He then developed a belt system by which these parts could be assembled speedily. With this system, he produced cars in such quantities that they could be sold cheaply enough for the average man to buy.

Paragraph 1

Main idea: _____

Details: A. _____
B. _____
C. _____

Paragraph 2

Main idea: _____

Details: A. _____
B. _____
C. _____
D. _____

Paragraph 3

Main idea: _____

Details: A. _____
B. _____
C. _____

DRAWING CONCLUSIONS

Below are several different sets of facts. Study each set carefully. Then see if you can draw the conclusion asked for from the facts given. The conclusion is not stated in any of the sets of facts. You'll have to think that out for yourself.

Write your conclusion on the lines beneath each set of facts.

1. The power in an automobile is produced by internal combustion. You might try this experiment under the supervision of your science teacher.

Go far away from any lighted fire. Place *two or three drops* of gasoline in an empty can with an open top. Shake the can to mix the gasoline with the air. When the gasoline has mostly all evaporated bring a lighted match close to the can. Hold the can at arm's length from you as you do this.

What do you think happens when the flame strikes the mixture? _____

What does this have to do with the power in an automobile? _____

2. Boats, automobiles, and airplanes have all been streamlined in recent years. The early models were not streamlined, and they met with great resistance as they traveled through water or air. Birds, animals, and fish are streamlined naturally. Their bodies are smooth and curved. They do not have parts that stick out sidewise to cause resistance to water or air. Designers have been using these animals as models in working out modern designs for boats, automobiles, and airplanes.

The word *streamlined* is a new word in our language. After reading the paragraph above, what conclusion can you draw in regard to the meaning of this word? _____

3. Before automobiles became so common, people had to live near their work. Now they can live many miles from where they work and still get home in a short time. Cars are used by seven out of ten workers to get to and from work. Thousands of families have moved from large cities to the suburbs.

What conclusion can you draw about the effect of automobiles upon the growth of suburban towns? _____

4. Until about 1880 most factories used steam for power. They had to burn great quantities of coal in order to produce the steam. The smoke from this coal poured out of their chimneys and settled over the towns where they were located. Both the factories themselves and the towns in which they were located were dirty and unpleasant.

Beginning at about 1880, a few factories began to make and use electricity for power. By 1910 power companies began to make electricity on a large scale, and it became quite cheap. Now practically all industries use electricity to run their machines.

What conclusion can you draw about the change that has taken place in the living conditions of factory towns in recent years? _____

5. During the War of Independence fought by the American Colonists, there were many people who wished to remain loyal to Britain. They were called the United Empire Loyalists. Not wishing to remain in the new United States of 1783, they emigrated to other lands.

Many colonists of the east looked north to Nova Scotia for new homes. Some had friends and relatives there. Early in 1783 a steady stream of Loyalists began to move from New York to Nova Scotia, of which 13,000 were brought to St. John harbor. This was the beginning of the city of St. John and the settling of the valley of the St. John River.

At that time there was no Province of New Brunswick. The land on both sides of the Bay of Fundy, together with Cape Breton, was called Nova Scotia. To obtain grants of land the settlers had to go to Halifax—a hardship for thousands of Loyalists. They petitioned Britain to make the country west of the Bay into a separate province. This was done in 1784, thus creating the Province of New Brunswick.

What conclusion can you draw in regard to the relationship between the War of Independence and the formation of the province of New Brunswick? _____

INCREASING YOUR MATHEMATICS VOCABULARY

The words below are among those which appear most often in *mathematics* books at your level. You will meet them frequently in your reading.

Probably you know how to pronounce several of these words already. But study the pronunciation of each one anyhow, just to make sure that you know how to pronounce it correctly.

Say each word to yourself, pronouncing it distinctly. Then read the meaning of the word and think about it as it is used in mathematics.

ampere ăm'pĕr	The unit by which electric current is measured.
annuity ă nŭ'ĩ tĩ	An amount of money payable yearly for a period of years or for life.
arc ărk	A portion of a curved line.
assess ă sĕs'	To fix value, as for purposes of taxation.
bisector bĩ sĕk'tĕr	A line dividing a line or angle into two equal parts.
bonus bŏ'nŭs	Something given in addition to that ordinarily received.
calipers kăl'ĩ pĕrs	An instrument used in measuring the thickness or diameter of objects.
capacity ká păs'ĩ tĩ	Extent of room or space.
coefficient kŏ'ĕ fĩsh'ĕnt	A symbol placed before another symbol or combination of symbols as a multiplier.
complementary angle kŏm'plĕ mĕn'tă rĩ	Two angles whose sum is 90 degrees; two angles forming a right angle.
concentric kŏn sĕn'trĩk	Having a common center, as circles one within another.
coupon kŏŏ'pŏn	A certificate of interest due on transferable bonds.
diagonal dĩ äg'ŏ năl	A line running slantwise; having an oblique direction.
equidistant ĕ'kwĩ dĩs'tănt	Equally distant.
exponent ĕks pŏ'nĕnt	A number written above and to the right of a symbol and denoting how many times the symbol is multiplied by itself.

Choose one of the words in the column to the left to complete the meaning of each of the sentences below. Write the word in the blank space where it belongs.

- Mr. Harper took out an _____ with an insurance company so he would have an income for life.
- The lumbermen used _____ to measure the diameter of a log.
- Mr. Stevens worked so hard that his employer gave him a Christmas _____ of \$100.
- The barrel had a _____ of 36 gallons.
- Tom marked off one sixth of the circumference of a circle. This portion was an _____.
- Ann drew a red line that divided an angle into two equal parts. The line was a _____.
- Harry put a dot in the very center of a circle. This dot was _____ from all points in the circumference.
- Jane drew a 60-degree angle. Then she drew a 30-degree angle next to it. The two angles were _____.
- Here is a formula: $3x + y = 27$. Since $3x$ means 3 times x , 3 is a _____.
- The electrician used the _____ in measuring the strength of the current.
- John used his compass to draw _____ circles, one within the other.
- The number 3 is the _____ in this combination of symbols: x^3 .
- Mr. Wright presented a _____ to get \$60.00 interest on his bonds.
- Men are employed by cities and counties to _____ property for taxes.
- Bob drew a line from the upper left-hand corner of a square to the lower right-hand corner. This line was a _____.

UNIT FIVE

PLANT MAGIC



You are about to read a story of magic. And remarkable as it may seem, this story is a true story.

It all started when a young man read a book that gave him some ideas. Find out how this book changed the life work of this young man and how it resulted in great benefits to all of us at the present time.

Beginning time: Hr. ____ Min. ____ Sec. ____

THE PLANT WIZARD *

All afternoon in the reading room of the public library young Luther Burbank sat at a table with a large, shabby book open before him. Outside, the sparrows twittered in the vines around the windows. People walked back and forth along the street, but he did not hear them.

The librarian came and let down the window shade noisily. She looked at him curiously, but still he did not move. People did not often come to the library to read a book that could not be taken out. Usually they got light stories and took the books home with them. But Luther had asked her for Darwin's *Animals and Plants Under Domestication*. She had found it on a high shelf, and here he was reading it. It seemed strange enough to her.

"It's closing time," she said at last. "It's more than closing time. I should have locked up ten minutes ago."

Luther Burbank stopped his reading and looked up. "If you will leave the book on the table, I'll be back tomorrow."

So it was every day until Luther Burbank had fin-

ished reading *Animals and Plants Under Domestication*. And every day as he read, his desire to experiment with plants grew stronger, and the world grew brighter.

This interest in Darwin's writings developed in Luther Burbank when he was twenty-one years old. He had just finished a year's study of medicine. But now he decided that he would rather experiment with plants than be a doctor.

As a child he had lived on a farm with his father and mother. From his mother he inherited a deep love for flowers. From his father he learned all the tasks of the farmer, gardener, and fruit grower. "Yet," Luther later wrote, "it is not certain that I should have put this knowledge to practical use at this time had it not been for the stimulation and fresh enthusiasm that came from reading one of Darwin's books. This book gave me insight into the world of plant life. It developed within me a desire to go into the field and find the answer to the problems that the book only suggested."

Marvelous things Darwin had done indeed, it seemed to Luther Burbank. He had taken animals and plants and by selecting and breeding them had changed them. He could take sweet peas, for instance, and gradually make them produce larger blos-

* Shippen, Katherine B., "Treasure of the Orchards," *Story Parade*, November 1951, pp. 63-64. Copyright, 1951, by Story Parade, Inc. Reprinted and adapted by permission.

Luther Burbank (lū'thēr bū'rāŋk): An American naturalist.
Charles Darwin (dār'win): An English naturalist.
librarian (lī brā'rī ān): One who has the care of a library.
domestication (dō mēs'tī kā'shūn): Controlling the growth of an animal or plant for the purposes of man.
inherited (īn hēr'it ēd): Having received something through an ancestor.

forage (fōr'ij): Vegetable food for animals.
knowledge (nōl'ej): That which is learned or understood.
stimulation (stīm'ū lā'shūn): Quickened activity.
enthusiasm (ēn thū'zī ās'm): Strong excitement of feeling in behalf of a cause.
marvelous (mār'vēl ūs): Causing wonder.
theories (thē'ō riz): Analyses or explanations.

soms, a sweeter fragrance, and a different color. It was like magic. Could someone else do things like that if he worked with patience as Darwin had worked?

That was exactly what Luther Burbank wanted to find out. By saving his money, he was able to buy a little farm. Here he started raising vegetables and seed for sale. While engaged in this work he began to experiment with corn and beans. He produced an earlier and better corn, and some interesting crossbred beans. And here he produced his famous "Burbank potatoes."

Everyone wanted to buy these potatoes for planting in his own fields. To his own surprise, Luther Burbank found that money came pouring in from their sale. Now he could afford to buy a bigger farm, where he could carry on more experiments.

"They say that in California the climate always is mild and sunny. It must be a great place for growing things," he told his mother.

So it was not long before Luther was on the train, heading for the West. Santa Rosa was the place he was going to—to a little house in a lovely valley there.

Before long his orchards and vineyards, his vegetable and flower gardens were growing around that house. And he was working in them hour after hour, day after day, year after year. Here by crossbreeding he made a beautiful double daisy out of a common weed, and caused the calla lily to give out fragrance. Here he developed a stoneless plum, a larger and sweeter prune, a white blackberry, and a thinner-shelled walnut with richer meats. Here he also developed a forage crop which would grow in desert regions to feed cattle.

In the eyes of the world Luther Burbank became a great man, for he had done things that no man had ever done before. Newspaper reporters traveled many miles to interview him. Scientists came to see him, too, and he paused among his berry bushes or the fruit trees where he was working to talk with them.

Burbank's work was not done to prove or test any particular scientific theories or to make scientific discoveries. He had for his sole aim the desire to grow more and better plants. "I shall be content if, because of me, there shall be better fruits and fairer flowers," said Burbank.

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:			

No. words $\frac{800}{\text{No. seconds}} \times 60 = \text{_____WPM}$

COMPREHENSION QUESTIONS

- 1. Where in the library did Luther Burbank read? _____
- 2. What was the name of the book he was reading, and who had written it? _____
- 3. What was the subject that the author had discussed in this book? _____
- 4. What had Luther planned to do for his life's work before he decided to experiment with plants? _____
- 5. How did he make a living during his early experiments? _____
- 6. How did he get money with which to buy a larger farm? _____
- 7. Why did he go to California to live and experiment? _____

- 8. What were three different plants that he changed? _____
- 9. What different classes of people came to visit him after he became famous? _____
- 10. What was his real aim in carrying on all these experiments? _____

Comprehension score: _____ Rate: WPM _____

DISCUSSION QUESTIONS

Answer the following questions on a separate piece of paper.

- 1. Have you ever read a book that awakened in you a strong desire to do something? If so, what was the book?
- 2. Luther was surprised when money came pouring in. What does this tell you about his purpose for carrying on experiments?
- 3. Burbank is sometimes called a *scientist*, sometimes a *botanist*. Under which of these classifications would you place him? Why?



THE WORK OF LUTHER BURBANK GOES ON

This farmer is planting corn. Each of the hoppers on his corn planter is filled with hybrid seed. This hybrid seed was made by crossing one breed of corn with another. Luther Burbank was the first man to cross different breeds of plants on a large scale.

Read the selection below to learn about some of the benefits which have come to man as a result of crossbreeding plants.

1. Scan the selection to find the main idea in each paragraph.

2. Now read the selection carefully, "gathering up" the entire cluster of ideas that belongs with each main idea. Try to remember each cluster.

3. When reading for details you can't read as fast as when reading for some other purposes. But you can learn to read for details faster than you usually do. Time yourself. Read as fast as you can and still "gather in" all of the details.

Beginning time: Hr. ____ Min. ____ Sec. ____

HOW DID BURBANK'S WORK BENEFIT MANKIND?

1. Canada has bountiful crops of grain, vegetables, and fruits. We not only have plenty of food for our own people, but we ship food to other people the world over. Luther Burbank made a very great contribution to this plentiful supply of food. He and scientists who followed him did much to provide us with more and better foods.

2. You have read about the famous Burbank potato. This potato is an example of the way in which the great botanist's work benefited mankind. One day Burbank noticed a seed ball on a potato plant in one of his fields. He planted the seeds and raised 23 plants. Each plant grew its own kind of potato. One, a beautiful, long red potato, decayed almost as soon as it was dug. Another potato was red-skinned with white eyes. Two others were white, and several had eyes so deep that they were unfit for use. All varied widely, but among these potatoes one was better than all the rest. This potato was superior to any potato Burbank had ever seen. By planting this new potato the plant wizard began raising his famous Burbank potatoes. Today more pounds of potatoes are grown than any other food crop. The increase

gained in planting Burbank potatoes amounts to millions of dollars each year. This increase came largely because Burbank produced this excellent variety of potato.

3. Luther Burbank benefited mankind in many other ways. He developed larger and more delicious fruits, a spineless cactus that could be used as food for cattle, and more beautiful and more fragrant flowers. Perhaps his greatest contribution, however, was that he paved the way for others to carry on and further the work that he began. Improvements in corn and wheat are excellent examples of follow-up work based on Burbank's discoveries.

4. Corn, one of the chief foods used by colonists and pioneers, played an important part in the development of this continent. It is still used as a food for people but about 85 per cent of the crop is fed to animals. Corn is also used in the manufacture of cornstarch and corn syrup. Cornstalks are used in manufacturing wallboard, cardboard, and coarse brown paper.

5. The early corn grown by the Indians was greatly inferior in quality to that grown today. In order to

advantage (ăd vān'tij): That which is favorable to success or to what is desired.

varieties (vā rī' ē tiz): Different kinds of things.

survive (sēr vīv'): To remain alive.

astounding (ăs tound'ing): Striking with wonder, surprise, or fear.

improvement (im prōv'mēnt): A change for the better.

inferior (in fēr'ī ēr): Of lower degree or rank on any scale.

superior (sū pēr'ī ēr): High in degree or rank on any scale.

original (ô rij'ī nāl): First in order of time.

resistant (rê zis'tānt): That which prevents a certain action from happening.

Marquis (mār'kwis): A nobleman of high rank; the name of a superior kind of wheat.

meet the rapidly growing needs for corn, scientists set to work to improve upon the original corn in several different ways. Two of the earliest experimenters were G. H. Shull and E. M. East who began their work in 1905. Farmers had been saving their best ears of corn for planting each year, so year after year the same corn was inbred. These experimenters found that when inbred corn was crossed with other inbred corn, the hybrid seed produced more bushels per acre than the original corn. It was better able to withstand wind, disease, drought, and cold. It was also more even in height, ear size, and time of ripening. These advantages have made it possible to use machinery more widely than ever before in harvesting corn.

6. Wheat is one of Canada's most important crops. Experiments in producing better wheat have resulted in large benefits to mankind. Wheat seeds were originally brought to our country from England, Australia, Russia, Turkey, and other countries. These seeds were planted in different parts of our country.

Farmers and seedmen selected for replanting those types of wheat that had grown best. Then hybrid varieties of wheat were produced. Like hybrid corn, hybrid wheat produces larger crops and is more resistant to the natural hazards of disease and weather.

7. Marquis wheat was developed in Canada by the Saunders family to meet the need for a wheat of high yield and early ripening. Prairie farmers had Red Fife wheat which produced a high yield but ripened late. To solve this problem Dr. William Saunders and his sons imported wheat from all over the world to their experimental farm at Ottawa. From these samples they developed Marquis wheat which has a high yield and ripens early.

8. Since then several more strains of wheat, other grains, vegetables, and fruits have been developed on Dominion Experimental Farms. And thus it is that Luther Burbank's work in cross-pollinating plants goes on. And as a result all of us are benefited by having better grains, fruits, and vegetables.

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>	
Ending time:	_____	_____	_____	No. words <u>770</u> $\times 60 =$ _____ WPM
Beginning time:	_____	_____	_____	No. seconds _____
Total time:	_____	_____	_____	Comprehension score: _____ Rate: WPM _____

ACTIVITY 1—OUTLINING PARAGRAPHS

Outline paragraphs 3 and 4. You may turn back to the selection to find the main idea in each paragraph, but see if you can recall the details without rereading them.

State both the main ideas and the detailed ideas in as few words as possible. Outline paragraph 7 on a separate piece of paper.

Paragraph No. 3

Main Idea: _____

Details: A. _____
 B. _____
 C. _____

Paragraph No. 4

Main Idea: _____

Details: A. _____
 B. _____
 C. _____
 D. _____
 E. _____

HOW ARE PLANTS IMPROVED?

You have read about the wonderful work of Luther Burbank in improving plants. You should also know about another great scientist who carried on important experiments with plants before the time of Burbank. His name was Gregor Mendel. You will read about Mendel in the selection below.

This selection is made up of two different patterns of writing which you find in *science* books: biography and problem solving.

Biography tells something about the life of a person. Problem solving tells about problems which scientists have studied, the experiments they have carried on, and the conclusions they have reached. You should read these patterns differently.

1. The first part of the selection is biography. It

tells about the life of Mendel. Read this as you would a story—just to follow through the events in Mendel's life. No doubt your speed will be about the same as it is in reading a story.

2. The second part of the selection is written in the problem-solving pattern. So adjust yourself to read this part differently than you did the first part. Read the heading of the second part and the two italicized subheadings. Locate the problem. Next read to find out what was done about the problem and what the conclusions were.

3. Time yourself in reading the second selection. You will read the biography faster than the problem-solving selection. But read both as fast as you can and still get the thought.

GREGOR MENDEL, HIMSELF

Gregor Mendel was born in Austria in 1822. His father was a farmer and a fruitgrower. Gregor, living in the midst of growing plants and animals, became interested in growing things in his early years.

When Mendel had grown to young manhood, he became a monk. As a monk he lived in a monastery in Brünn, Austria. He now became greatly interested in the problem of why certain traits of children were inherited from their parents, and why others were not. In his lifetime he could not experiment with generations of human beings or even generations of animals. So he decided to experiment with plants.

Mendel had a small garden alongside the monastery. His patch of ground was only about 20 by 120 feet in area. In this garden he grew twenty-two different kinds of peas. There were some plants with tall stems and some with short stems. There were some that produced wrinkled seeds and some that produced smooth seeds. There were some that had green seeds and some that had yellow seeds. And some that had white flowers and some that had purple flowers.

Mendel experimented with these different kinds of peas for years. Then he told others about the principles of inheritance that he had discovered.

Beginning time: Hr. _____ Min. _____ Sec. _____

HOW MENDEL DISCOVERED PRINCIPLES OF INHERITANCE

Mendel's Experiments. Mendel first attempted to find how tallness and shortness is inherited. He chose a tall plant and a dwarf plant. He covered the flowers to keep pollen from other plants away from them. Then he placed some of the pollen from the dwarf plant on the stigmas of the tall plant. He also placed some pollen from the tall plant on the stigmas of the dwarf plant. Because of this crossbreeding, the fertilized seeds in each plant received some of their inheritance from both the tall plant and the short plant.

The next step was to plant the seeds of these two plants to find out what kind of plants they would produce. You might expect that these plants would be about medium in height—halfway between short and tall. But this was not the case. All of the plants were tall!

Mendel knew that these plants came from parents with opposite traits—tallness and dwarfness. The trait of dwarfness seemed to have disappeared. Since all of the plants were tall, Mendel called this a *dominant*.

Gregor Mendel (gră'gôr mên'dêl): An Austrian botanist.
biography (bī ōg'ŕā fī): History of a person's life.
monastery (môn'ās tēr'ī): A house where monks live apart from the world.
stigma (stig'mā): That part of the pistil of the flower which receives the pollen grains.
pollinate (pôl'ī nāt): To fertilize with pollen.

inheritance (in hēr'ī tāns): That which is received from an ancestor.
principle (prīn'sī p'l): A general truth, a law.
heredity (hê rēd'ī tī): The passing of traits of parents to their offspring.
dominant (dôm'ī nānt): Having controlling influence.
recessive (rē sēs'iv): Tending to go back.

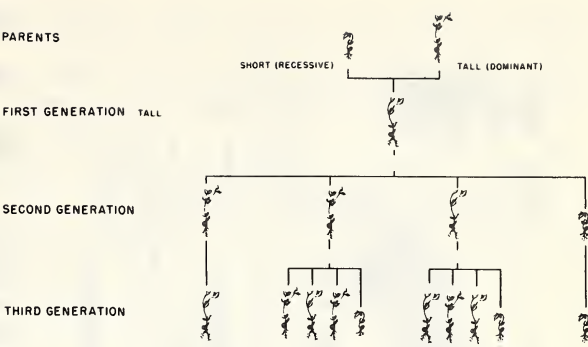
nant trait. Since the trait of being short seemed to have receded or disappeared, Mendel called that a *recessive* trait.

The next problem was to find out what kind of plants the seeds from these tall plants would grow. He allowed them to pollinate themselves. The ripe seeds were saved and planted the next year.

Do you suppose that he got all tall plants from this second planting? No, he didn't. The dwarf trait showed up again this time. Some of the plants were dwarfs, some were tall. But many more were tall than short. There were about three times as many tall plants as there were short ones.

When Mendel bred this second generation, he discovered that it had *three* kinds of plants. The fourth of the second generation that was dwarf always produced more dwarf plants when bred with other dwarfs. Of the three-fourths of the second generation that was tall, one part proved to be pure tall plants that *bred true* (produced plants showing the dominant trait only), and two parts proved to be hybrids that carried both tall and dwarf traits. When the hybrids were bred with one another, they produced a generation of tall and dwarf plants in a proportion of three to one.

Mendel's Conclusions. Mendel tried these same experiments over and over again. He used seeds from the tall plants and short ones; from the plants bearing yellow seeds and those bearing green seeds; and from those that had wrinkled seeds and those that had



This Diagram Shows What Mendel Discovered by Planting Tall and Short Plants.

smooth seeds. He always got the same results. So he drew these conclusions:

1. Some traits are dominant and some are recessive.
2. When plants having unlike traits are crossed, the offspring of the first generation are hybrids, showing the dominant trait only.
3. When first-generation hybrids are crossed, the second generation is one-fourth pure dominant, one-fourth pure recessive, and two-fourths hybrid showing the dominant trait. The pure dominant and recessive plants breed true. The hybrid plants reproduce the dominant and recessive traits in a proportion of three to one.

Ending time: _____ Hr. _____ Min. _____ Sec.
Beginning time: _____ Hr. _____ Min. _____ Sec.
Total time: _____ Hr. _____ Min. _____ Sec.

No. words 520 $\times$ 60 = _____ WPM
No. seconds _____

ACTIVITY 1—CHECKING COMPREHENSION

Write "Yes" or "No" after each statement.

1. Mendel's first experiments were with plants bearing smooth seeds and those bearing wrinkled seeds. _____
2. Mendel did his crossbreeding by exchanging pollen between the plants with which he was experimenting. _____
3. Seeds from plants between which he had exchanged pollen had the traits only of the plant on which they grew. _____
4. All of the plants from the seeds of tall plants that had been crossbred with short plants were short. _____
5. Tallness was recessive in these plants. _____
6. The trait of shortness was dominant. _____
7. The second generation of seeds from the crossbred plants grew about three-fourths tall plants and one-fourth short plants. _____

8. When Mendel bred the second generation, he found that about one-fourth of this generation were pure tall plants, one-fourth pure short, and one-half hybrid. _____
9. The pure tall plants produced only short plants. _____
10. The hybrids produced only tall plants. _____

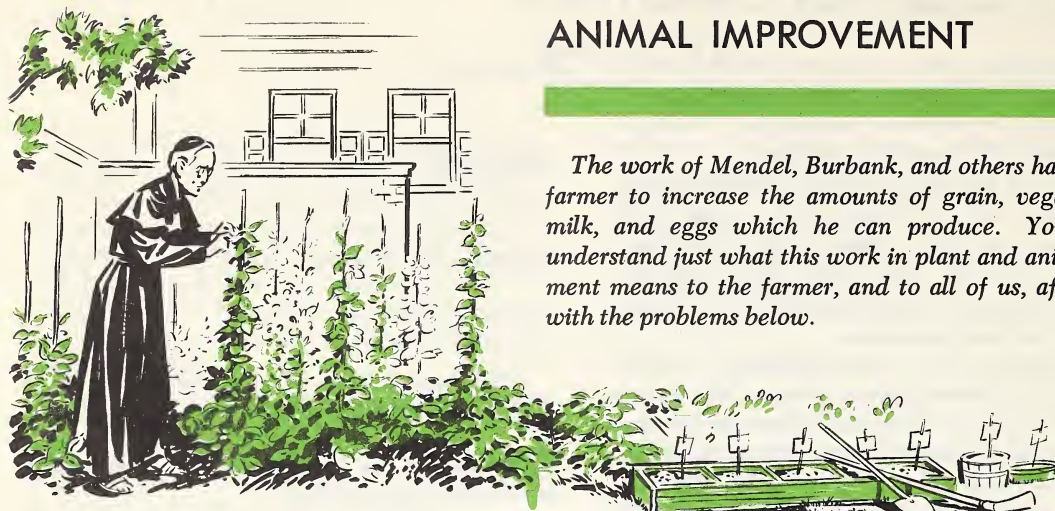
Comprehension score: _____ Rate: WPM _____

Study your rate and comprehension scores. If you had a high rate and low comprehension score you probably read too fast. If you had a high comprehension score and low rate, perhaps you should have read faster.

ACTIVITY 2—DIAGRAMING PRINCIPLES

Get a separate piece of paper. Make a diagram to illustrate principles 2 and 3 using mice instead of plants. Start with one white mouse and one black mouse. Show what would happen through *four* generations.

PROBLEMS ABOUT PLANT AND ANIMAL IMPROVEMENT



Mendel Working in His Little Garden

The work of Mendel, Burbank, and others has enabled the farmer to increase the amounts of grain, vegetables, fruit, milk, and eggs which he can produce. You can better understand just what this work in plant and animal improvement means to the farmer, and to all of us, after you work with the problems below.

In working with each of these problems do the following things:

1. Read the entire problem carefully enough to get its meaning as a whole.
2. Reread parts of the problem to get the particular information needed to fill the blank spaces under the headings in the chart on the next page. Write that

information under each heading as soon as you have decided upon it. In case a problem has two or three parts you will need to write the information for each part. Write this information opposite A, B, or C, after the number of the problem, according to whether the part is the first, second, or third part of the problem.

GARDEN PROBLEMS

1. The garden in which Mendel did his experimenting was 20' x 120'. How many square feet were there in his garden? What part of an acre was this (43,560 square feet = 1 acre)?
2. Mendel crossbred tall and short peas. The tall trait was dominant. According to his principle, the dominant trait appears in 3 out of 4 plants in the second generation. If this holds true, how many tall plants will be found among 64 plants of the second generation? How many short plants will be found in this second generation of peas bred by Mendel?
3. In one bonfire Burbank burnt up 499 cherry plants out of 500 he had grown; 99,987 rose bushes out of 100,000; 14,821 gladiolus bulbs out of 15,000; and 19,783 cactus seedlings out of 20,000. How many plants did he burn up in this bonfire? How many did he save? What decimal part of the total number of plants did he save?
4. Burbank (1849-1926) devoted a span of years equal to $\frac{5}{11}$ his age at death working with berries. How many years did he spend working with berry plants?
5. In 1954 potato consumption dropped to $1\frac{3}{16}$ of

the 1935-39 average. Express this fraction as a decimal.

6. A berry grower had one-third of his acreage in blackberries, two-fifths in raspberries, one-sixth in dewberries, and the rest in Paradox. What part of this farmer's acreage was in Paradox berries?
7. In a certain year 100,000 bushels of Marquis wheat were produced. This was but $\frac{1}{3000}$ of its production five years later. How many bushels of Marquis wheat were produced five years later?
8. Corn has a calorie value which is $1\frac{3}{4}$ that of peas. If 100 grams of peas is rated at 70 calories, what would be the calorie rating of an equal weight of corn?
9. Annual milk production was reported in 1870 as 12,681 pounds per cow. As a result of careful breeding, champion Holstein cows now produce 40,000 pounds of milk per year. What is the difference between the amount of milk sold by a farmer who had five good cows in 1870 and the amount sold by a farmer who has 5 champion Holstein cows at present? What would be the difference in income from milk sold by the two farmers if the farmer in 1870 sold his milk for 3

cents per pound and the present farmer sells his milk at 6 cents per pound?

10. A man who had a chicken ranch kept 1,000 hens which produced a yearly average of 150 eggs each. He sold 500 of these hens and replaced them with

champion White Leghorns which had been bred to produce an average of 300 eggs per year. How much did he increase his egg production during the period of three years following this replacement?

<i>Problem No.</i>	<i>Asks You to Find</i>	<i>Facts Given</i>	<i>Processes to Use</i>	<i>Estimate of Answers</i>
1. A. B.				
2. A. B.				
3. A. B. C.				
4. A.				
5. A.				
6. A.				
7. A.				
8. A.				
9. A. B.				
10. A.				

Compute the ten problems with which you have been working, making use of the information in the chart. With all of this information at hand, you should be able to do your computations very quickly.

Applying What You Have Learned About Reading Problems

If you have trouble in solving problems try this plan: when you are about to tackle a new set of problems make a chart like the one above. Then read and reread each problem to find information

to place under each of the headings. Once you have the information before you, it won't take long to compute the problems. When you do compute them, the answers will probably be correct.

DIVIDING WORDS OF SEVERAL SYLLABLES

Most of the new words that you will meet during your future years in high school will be long words of from three to six syllables. You probably will have no trouble in pronouncing these words if you first divide them correctly into syllables.

In working with words of several syllables you use the same guides that you have been using in dividing words of two syllables. However, you may use two or three different guides in working with one word.

In dividing the word *contribution* for example, you use three of the different guides: (1) con is a prefix. So the first thing you do is to draw a line between con and the rest of the word. (2) Next, you see the blend tr. You know that you treat this blend as if it were just one consonant and don't split it. (3) Looking ahead you find the consonant b between two vowels, i and u. So you divide just before the consonant, drawing a line between i and b. (4) Looking ahead again you see another consonant, t, be-

tween two vowels, u and i, and you know you should draw a line before the t. (5) Besides, you know that ion is a suffix and that a root word often gives a t to a suffix. So your final division of the word looks like this: con tri bu tion.

Divide the words below into syllables. Use as many of these different guides as are necessary in dividing each word. Remember the exceptions.

1. Divide between words in a compound.
2. Divide between double consonants.
3. Divide between separately sounded consonants between two vowels.
4. Divide before a single consonant between two sounded vowels.
5. Treat consonant blends and speech sounds as single consonants.
6. Divide between prefixes, root words, and suffixes. Remember that le, ble, cle, and so forth are treated as syllables.

transmitter	frequently	incandescent	argument
personnel	opposite	pamphlet	misfortune
scoutmaster	advantage	conclusion	importance
messenger	commonly	discussion	collection
accounted	advertisement	solution	decreasing
dangerously	circulation	possible	relationship
broadcasting	approximate	vaccination	pictograph
comprehension	advantage	corpuscle	explanation
principal	mercury	immunization	community
compliment	estimate	particle	attention
independence	enrollment	successfully	schoolroom
information	unbearable	computation	supported
disadvantage	explorer	examination	solution
department	confident	institute	injection
nursery	vacation	combination	notation
difficulty	intelligent	Ontario	decompose
partisan	internal	rattlesnake	masticate
handkerchief	furniture	profession	insulin

WORKING WITH ACCENT MARKS

Marking Accents

You know that an accent mark placed after a syllable tells you to stress or place more emphasis upon that syllable when you pronounce the word. You

know how to pronounce the words below, but as a quick review place the accent mark right after the stressed syllable in each one of them.

sud den	trav el	pub lic	serv ice
for est	per cent age	sup port	en tire
ex plode	de pend	ap ply	ad di tion
tel e phone	cit i zen	A mer i ca	con clu sion
de fense	re la tion	im por tant	for ma tion

Marking Syllables and Noting the Schwa Sound

You have had some work with the “schwa” sound of vowels. You know that this sound is something like a very soft, short u, and that it is the same for all vowels. Do you know that accents have something

to do with this vowel sound—the “schwa” sound?

Place the accent mark where it belongs in each of the words below. Then draw a line under the schwa sound in each word.

doz en	ar rive	car bon	to tal
at tend	state ment	pos si ble	op pose
per son	hap pen	af fair	a mount
wal rus	im i tate	pu pil	suc cess

Cross out the wrong word in this conclusion: The schwa sound always occurs in accented unaccented syllables.

Marking Primary and Secondary Accents

Many words have two syllables that are accented. Equal stress is not placed on both accented syllables, however. One is stressed more heavily than the other. The heavy stress is called the primary accent. The lighter stress is called the secondary accent. In the word con ser va tion the syllable va is stressed heavily. The syllable va has the primary accent, and the syllable con has the secondary accent. In Web-

ster's dictionary, the primary accent is shown with a large, bold accent mark like this ' , and the secondary accent is shown with a short, light mark like this ' .

Below are some words which you have had in Units One through Five of this book. Place a heavy black accent mark after each syllable that has a primary accent. Place a light, short accent mark after the syllable that has a secondary accent.

man u fac ture	pro nun ci a tion	clas si fi ca tion
trans por ta tion	dic tion ar y	dis in fect ant
hel i cop ter	in ter plan e ter y	ex am i na tion
op er a tion	re spon si bil i ty	dis trib u tion
con cen trat ed	in di vid u al	con den sa tion
in for ma tion	sat is fac tion	math e mat ics

CRITICAL READING OF PROPAGANDA

You have learned by this time that you need to *think* about what you read. Don't accept everything others have stated in print. Evaluate and judge for yourself.

This is especially necessary when reading propaganda. Material that is written, spoken, or pictured for the purpose of changing our point of view or line

of action is called *propaganda*. It is very important that you recognize propaganda when you read it. After recognizing it you should then decide for yourself whether or not you wish to be influenced by it.

There are a few tricks which are often used by writers who wish to influence our thinking. Some of these "tricks" are discussed below.

Propaganda Tricks

1. **Bad Names.** When using this trick, the writer uses disagreeable words to arouse in you fear, hate, or disapproval. In attempting to sell you something the writer may try to cause you to apply several unpleasant words to yourself. His purpose is to move you to do something about improving the situation by buying the product advertised.

2. **Glad Names.** This is the opposite of the "bad name" trick. In using this trick the writer uses pleasant words to move the reader to admire or vote for a person. In advertising it is used to cause you to buy the product which is supposed to give you all of the desirable qualities mentioned in the advertisement.

3. **Transfer.** In using this trick the writer tries to get us to transfer our admiration from one thing to another. As an example: an advertisement may show the picture of a famous movie star using a certain soap. The writer hopes to have us transfer our admiration for the movie star to the soap, and then buy it because of our admiration for the star.

4. **Testimonial.** This trick is something like transfer except in this case the star goes so far as to recom-

mend the product. The words that he has said about the product are printed. He gives a "testimony" to the effect that he has used the product and found it very wonderful. If the famous person praises the product and says that he has used it, then we think it would be a good thing for us to use. Then we are supposed to go out and buy it.

5. **Plain Folks.** Most people admire humble, common people who are successful because of their own efforts. Even when they gain fame and honor, they often remain humble and genuine. Those who write propaganda realize the appeal that "just plain folks" has for many people. So they often paint word pictures of people they wish to promote as being "just plain folks." They point out that the person whom they wish us to admire does the same things that any ordinary person would do.

6. **Band Wagon.** The "band wagon" trick depends upon getting us to accept something because everyone else is using it or approves it. This trick is based on the theory that you will want to think, vote, or buy what the great majority favors.

Recognizing Propaganda Tricks

Below you will find some examples of propaganda. Try to identify the trick used by the writer of each. Decide upon the trick used and name it on the line above the example.

1. A picture of a famous television star shows her setting out some plants in a garden. Beneath the picture it says, "Melba Star is not afraid that gardening will spoil her lovely hands."

Then a paragraph appears, saying:

"Beautiful hands add much to a woman's appearance. Stone's hand lotion is made especially to keep hands in good condition. Try it once and you'll never be without it."

2. A picture is shown of a famous ballplayer sprinkling a powder over his lawn with one hand. In the other hand he is holding a can labeled, *Lawn Grow*.

Beneath the picture the following paragraph is printed. It is signed with the ballplayer's name.

"My lawn is always green and fresh. That is because I use 'Lawn Grow.' I have tried many different kinds of grass food. I find 'Lawn Grow' to be the most satisfactory of them all."

propaganda (prōp ā găn'dā): Systematic spread of thought.
critical (krit'ī kāl): Using careful, systematic judgment.

advertisement (ăd vûr'tiz mēnt): A public notice printed to inform, interest, or influence the reader.

3. Our magnificent hybrid mums are the most beautiful in the world. Plant our strong, vigorous young plants. See them burst into gorgeous, dazzling color. Have hundreds of rich, ruby-red, golden yellow, glowing bronze, pearly pink, and jade-white blossoms.

4. Thousands of people are flocking to our doors to see our new steel swimming pool. Everyone who sees this pool wants it. More people are buying this pool than any other pool on the market.

5. Do you dread the wearisome task of mowing your long-neglected lawn? Do you have an aching back and sore muscles after pushing a heavy lawn mower back and forth over tough, wiry grass? Are you exhausted after a struggle in using this energy-sapping machine? We can end all of your troubles with our new electric lawn mower.

6. Mr. Thomas Miller was running for the provincial legislature. During this time a picture of Mr. Miller appeared in a daily paper. The picture showed Mr. Miller driving a tractor to plough a field. He was wearing a battered straw hat, open-collared shirt, and blue overalls.

The article under this picture started out by saying: Mr. Miller spends much time on his farm. While there, he ploughs fields, milks cows, pitches hay, and goes to agricultural meetings with his neighbors.

7. An ad for "No-Weight" low-calorie beverage shows an actress supposedly drinking a glass of this beverage. Beneath the picture these words appear: "Movie actresses must have slim, attractive figures. I keep my figure trim by drinking No-Weight beverages."

(Signed) Arlene Glamour

8. A picture in a magazine shows a promising young man in the sports world whose manager is trying to promote him to become a famous star. The picture was taken in the kitchen of the would-be star's home. His wife was washing dishes in the kitchen sink. The sportsman was wearing an apron and drying dishes.

9. Miss Stone went into a store to buy a new coat. "I would like a royal-blue fitted coat," she said to the clerk who was helping her.

The clerk looked through the stock and returned with a navy, loose-fitting coat. "Here is a beautiful navy coat," said she. "Navy is always the most wanted color. More people ask for navy than any other color. And loose, flowing coats are all the rage this year. Everyone is wearing them."

10. The writer of an article wanted to promote a person representing a certain political party to a higher government office. The article told about the childhood of this man. The content of the entire article was similar in intent to the following:

"George Clifton is the son of an average Canadian family, living in a small town on the prairies. His father runs a general store in this town.

"At an early age George began to work in the store. He spent long hours before and after school helping to unpack goods and arrange them on the shelves. He dusted the counters each morning and carried coal to replenish the fire in the store's stove. As soon as he was old enough, he began to wait on customers and made daily deliveries on his bicycle, with packages tied to the handlebars."

11. An advertisement addressed to people who wear false teeth reads:

"*Denture powder.* Do you have loose-plate discomfort? Our powder is different from all others. It doesn't leave a gummy slime in your mouth. It doesn't taste unpleasant. It doesn't sour. It removes 'denture breath.' Get it at your corner drug store."

12. A picture is shown of a popular radio singer. He is seated in a luxurious X-Brand car of the latest model. This text appears under the picture:

"I have always driven the X-Brand car. I get a new one every year. Wouldn't have any other."

(Signed) Tom Tenor

CRITICAL READING OF ARGUMENTS FOR AND AGAINST SOME ACTION

In your history books you often read arguments which some people made for the adoption of a law or policy. And you read about arguments which other people made against the adoption of the same law or policy.

At present we often read arguments about such topics as: uses of atomic power, national support of schools, the best buys in automobiles, and so on. Usually you find the arguments "for" in one place and the arguments "against" in another. But you should find and read arguments on both sides. Weigh all of the arguments carefully. Then make

your own decision as to whether you personally are for or against the thing discussed. Be just and fair in making your judgment.

Below you will find selections giving arguments *for* and *against* buying shrubs and trees from different sources. Read each selection carefully. Weigh the arguments *for* and *against* in your mind. Then decide which is the stronger set of arguments in each case and whether or not you would buy from that source.

Write answers to the questions under each of the selections below.

Buying from a Mail-Order House

Many people buy their shrubs and trees from a mail-order company. This is a very easy way to buy. You don't need to leave your house. All you have to do is to write a letter and a check. Mail-order houses have a large supply of stock, also. Often you can get varieties from such companies which you couldn't get elsewhere. They sell in quantities and their prices may be lower than those at a local nursery. Of course, you cannot see what you buy before you pay for it. Another disadvantage is that the trees or shrubs are usually shipped with bare roots. So there is a danger of them drying out or being damaged. You can't plan the exact time at which the shipment will arrive. It may come at a time at which you are too busy to plant. The people who sell your order to you are not near enough to give you personal advice and instructions on planting and care.

What are the arguments "for"?

1. _____

2. _____

3. _____

4. _____

What are the arguments "against"?

1. _____

2. _____

3. _____

4. _____

Which is the stronger set of arguments? Write *for* or *against*: _____.

Would you buy from a mail-order house? _____

Buying from a Local Nursery

A local nursery is convenient. There is usually one near your home. The stock has been grown in your vicinity and is accustomed to your climate and soil. You can see what you are buying and most nursery men guarantee their stock. They are specialists who can give you helpful advice. Often they will do your planting for you for a small fee.

One drawback is that they usually do not have a large stock from which to choose. Also, their prices vary from one to another. You can meet this difficulty by shopping at two or three nurseries and buying

where you can get what you want at the best price.

Think about the arguments for and the arguments against.

Which is the stronger set of arguments? _____

Would you buy at a nursery? _____

Which of the two places mentioned do you think would be the best place to buy trees and shrubs? _____

INCREASING YOUR SOCIAL STUDIES VOCABULARY

The words below are among those that appear most often in *social studies* books at your level. You will meet them frequently in your reading both in and out of school.

Perhaps you already know how to pronounce many of these words, and what they mean. But study them to make sure.

Say each word distinctly to yourself to make sure that your pronunciation is right. Read the meaning of each word and think about it also. The special meaning of the word in *social studies* may be different from the one you have in mind.

colonialism kò lǒ'nǐ ǎi z'm	A policy favoring one country's rule of other countries, or settlement of remote lands.
indemnity in dēm'nǐ tǐ	Protection from loss or damage; insurance; compensation for loss.
indictment in dīt'měnt	A formal, written criminal charge.
injunction in jūngk'shǔn	An order to do or not to do certain things, as issued by a court.
legal lē'gǎl	Based upon or governed by law.
loyalty loǐ'ǎi tǐ	The state of being faithful and true to a duty, love, cause or principle.
magistrate mǎj'is trāt	A person having power as a public civil officer.
metropolis mē trǒp'ò lis	The chief or capital city of a country, state, or region.
militia mǐ lish'á	A body of civilians enrolled as soldiers to serve in emergencies.
municipal mū nis'ǐ pǎl	Having powers of local self-government.
naturalization nǎt'ù rǎi lǐ zǎ'shǔn	The process of conferring the privileges of citizenship upon a foreign-born person.
navigation nǎv'ǐ gǎ'shǔn	The science of conducting ships over the water from one place to another.
null nǔl	Of no legal force; amounting to nothing.
pacifist pǎs'ǐ fist	One who tries to make peace or who is opposed to war.
partisan pǎr'tǐ zǎn	One who takes the part of some party or cause and is strongly devoted to it.

Choose one of the words in the column to the left to complete the meaning of each of the sentences below. Write the word in the blank space where it belongs.

- William Lyon Mackenzie had an _____ issued against the people who wrecked his printing shop.
- Montreal is the largest _____ in Quebec.
- Mr. Bagaly was a Hungarian citizen. Five years after he came to Canada he took out _____ papers.
- He swore _____ to our government.
- The deed was made out by a lawyer, and it was entirely _____.
- An elected council controls _____ affairs.
- Several smaller colonies at present are asking to be free from some distant country that governs them. They don't like _____.
- Henry Ford went to Europe thinking he could stop World War I. He was a _____.
- The insurance company paid Mr. Andrews a \$15,000 _____ for loss of his house by fire.
- An old law which called for the punishing of witches is now _____.
- The court issued an _____ to prevent the building of a roller-skating rink in the park.
- The entire _____ was called to engage in an important battle.
- Mr. Smith was a _____ of the Liberal party.
- Peter wanted to be a seaman. He studied _____.
- A _____ has the power to impose fines.

UNIT SIX

OUR SCHOOLS



This is a true exciting story that took place in St. Boniface and Winnipeg when the Red River flooded in May, 1950. Find out how teachers, Cadet Signalers, and flood control workers all worked together in this emergency.

Beginning time: Hr. _____ Min. _____ Sec. _____

MAINTAINING THE DIKE *

May 5th was a memorable day in Provencher school. No examinations had been scheduled nor was lesson preparation in the minds of the teaching staff and students. The Red River was in flood!

A wide ribbon of muddy water, the Red River usually meanders peacefully the 555 miles from its source in Minnesota to its mouth on Lake Winnipeg. On the average of once a generation, however, it oozes over its banks in a great effort to engulf everything in its path. May 5th was such a day.

The trouble had started the previous fall. There had been late fall rains in the river valley followed by heavy frost. The rain soaked into the soft clay and the frost locked it in. Then there were heavy snowfalls during the winter followed by a late, quick spring and heavy rains. The abundance of water filled the channel of the Red River to capacity, and the flat river banks offered no protection to the people in the valley. The water rose to its highest level since 1861.

Many homes were in danger of flooding, and women and children were evacuated from the areas that were close to the twisting course of the river. Some businesses were disrupted too as men fought to keep the water away from their homes. As the river rose the flood control workers built dikes. Hundreds of sandbags were hoisted into position, and many more were held in reserve dumps awaiting emergency calls. The effectiveness of the dikes depended upon the fast delivery of these sandbags to points where the water was seeping through the wall of bags. A good communication network was essential to the relaying of these calls for more supplies.

Brother Joseph Bruns, principal of Provencher school, saw an opportunity for his Cadet Signalers to serve. He contacted the flood control personnel, and his offer of help was gratefully accepted. Quickly, Brother Eugene Meyer, the school's wireless communications instructor, gathered his cadets. Within a few hours he had set up a No. 19 transmitter-receiver as a control station in the Headquarters room of the St. Boniface community center of Norwood. In an effort to save the Norwood community a dike had been built along Lyndale Drive. The students took up their positions at strategic places along this Lyndale dike. The cadets on duty each had 30 pounds of Walkie-Talkie equipment strapped to their backs, and often they stood ankle deep in mud and water so they could catch the first mention of trouble from the men maintaining the dike. Every desperate appeal for sand, dirt, and essential supplies was relayed by the students to flood control headquarters and then to the two main supply dumps.

Every available man was needed for work on the dikes so there were no replacements for the students. The original team worked for more than 24 hours straight before they were relieved.

No one thought of grumbling or quitting. The Red River was still rising, and only the continued prompt sending of appeals and the quick delivery of supplies would save the dikes. Day and night for a fortnight the Cadet Signalers kept their communication channels open.

Eventually, graduate Provencher cadets heard of the work which the students were doing. They had been trained in wireless communication when they attended Provencher school, and they rallied to give the students

* Adapted from material supplied by the Winnipeg Free Press.

welcome relief. Together they organized the daily dike work so it moved with precision.

At least one cadet found that his assignment was the envy of all his signaler friends. He was assigned to the plush surroundings of the Fort Garry hotel. Here in the midst of comfort he set up his receiving station to report on the success of officials to get help from outside communities.

As the river continued to rise various Walkie-Talkie out-stations were redispersed along the dike. The boys had been well trained, adapting quickly to new conditions, so there was no break in communications.

Before the Red River flood was curbed, 15,000

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:	_____	_____	_____

1. Why was May 5, 1950, a memorable day in Provencher school? _____

2. What caused the river to flood? _____

3. What method was used to hold back the flood water? _____

4. Why did the school principal contact the flood control personnel? _____

5. What other responsibility did Brother Eugene Meyer have in addition to teaching school? _____

6. Where did the boys set up their Walkie-Talkie operations? _____

7. Enumerate the conditions under which the students worked. _____

8. How long did the Signalers help the flood control men? _____

houses, farm buildings, and business blocks along its banks from its source to its mouth were filled with water to some degree. Millions of dollars of damage was done, and 100,000 Canadians and 20,000 Americans were driven from their homes. In St. Boniface, however, the Lyndale dike held and the Norwood community was spared heavy flooding. Much credit for the successful completion of this task goes to this handful of Cadet Signalers from Provencher school. The citizens are proud of groups of young students like the Signalers who assume with distinction a man's responsibility in a time of crisis.

No. words $\frac{840}{\text{No. seconds}} \times 60 = \text{_____ WPM}$

9. From whom did the school Cadet Signalers receive help? _____

10. What was the result of the boys' work? _____

11. Write the meaning of each of the following words as used in this story:

a. meanders _____

b. strategic _____

c. precision _____

d. redispersed _____

Comprehension score: _____ Rate: WPM _____

DISCUSSION QUESTIONS

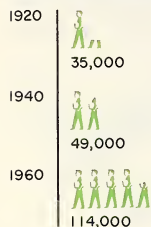
Write your answers on a separate piece of paper.

1. What is meant by the words "on the average of once a generation"?
2. Why do you think the flood control personnel gratefully accepted the offer of help?
3. Name three commendable traits of character which the Cadet Signalers displayed. Explain your choices.
4. Suggest some of the possible effects of the flood on the lives of the people.
5. Write this thought in your own words. "The citizens are proud of groups of young students like the Signalers who assume with distinction a man's responsibility in a time of crisis."

HIGH SCHOOL ENROLLMENT



COLLEGE ENROLLMENT



THE SCHOOL'S CONTRIBUTION TO CANADIAN LIFE

In the story that you have just read, one of our schools served the community. Schools are giving more and more service to the community these days. The first and most important contribution which our schools make, however, is to educate young Canadians.

There is a much larger percentage of Canadian boys and girls in high school and college now than ever before. What does this mean to our country? What effect will educating so many more young people have on the future of Canada? You will find some of the answers to these questions in the selection below.

1. Read this selection as fast as you can, but not so fast that you can not understand all that it says. Pick out main ideas and details as you go along.

2. After reading the entire selection, do Activity 1. You will be asked to do *critical thinking* about statements made in this selection.

Beginning time: Hr. ____ Min. ____ Sec. ____

YOUR SCHOOL *

Education is necessary to the welfare of a nation. This is particularly true of our nation, because it is a democracy. The decisions made by our federal parliament reflect the wishes of the mass of the citizens. Whether our nation's decisions are wise depends upon the wisdom and understanding of the individual citizens. Whether the individual citizen understands national problems depends in large measure upon the education he receives. In this way education is of great importance in understanding and running our nation.

Much is at stake in our country, as in any democracy. Our country is influential among the nations of the world, and we are often in a position to influence world decisions and world progress. The future of our nation is being determined today in the schoolrooms of Canada.

During the Colonial period few children received a good education because education was not so necessary in the life of those people. The children as well as the older people were busy clearing farms and building log houses and barns. Considerable atten-

tion, however, was given to reading. Most of the schools were privately owned and only a few children attended. The buildings were crude, the stock of books meager, and the teachers often poorly trained.

Between 1840 and 1870 there was a great awakening in education. Advancements in the economy of the country and in the expression of democratic principles in both government and society made the changes in education possible. Schools were opened to all children and were supported by the people in the district. Teachers received better training and courses of study were outlined. Textbooks were authorized and made available.

These changes were brought about chiefly through the leadership of men like Ryerson in Ontario, Meilleur in Quebec, and Rand, Forrester, and Dawson in Nova Scotia. To these great educators and their co-workers goes much of credit for laying a fine foundation for our public school systems in Canada today.

Schools contribute to citizenship in many ways. They provide us with the information we need to become intelligent readers and wise voters. We learn the causes of the rise and fall of nations, so that we may better guide our nation's great future. We find out what has been contributed by our ancestors to make

* Based upon material prepared for this book by Wallace E. Lamb.

us free and great and strong. We learn that our freedom cannot be taken for granted; and that for every right or privilege which we enjoy we also have a responsibility.

In our classrooms we live with boys and girls who represent all kinds of homes, religions, races, and languages. In our relations with our fellow students, we learn the secrets of democratic living with other human beings. We learn that generally the amount of satisfaction we get out of an activity depends upon how much effort we put into it. And we discover that we do not get anything for nothing. In learning how to be good citizens in our schoolroom, we learn how to be good citizens in our community, our province, and our nation.

Schools are supported in various ways, depending somewhat upon the province in which we live and the type of school we attend. Much of the money for our public schools comes from taxes paid by the local taxpayers. In general, the amount of the tax paid depends upon the value of the real estate owned.

This seems unfair to some people who feel that real

estate carries an undue portion of the tax load. Others feel that it is unfair to the children in some of the poorer provinces.

In some provinces much of the money used in running public schools comes to the local community from the provincial government. The province gets its money from many taxes. The federal government also contributes some money to the public schools. Any money that the federal government contributes, however, is used for a special purpose, such as courses having to do with vocations, or with the education of the Indians. The federal government does not contribute anything to the day-to-day support of the public schools.

Private schools are supported largely, and sometimes entirely, by tuition payments and religious or personal contributions. When they do receive help from public sources, it is generally for transportation, medical examination, or similar special service. But whatever your school, most of the money for its support is paid willingly in the hope that you can build a better world for tomorrow than we have today.

	Hr.	Min.	Sec.
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:	_____	_____	_____

No. words 780 $\times 60 =$ _____ WPM
No. seconds _____

Comprehension score: _____ Rate: WPM _____

ACTIVITY 1—THINKING CRITICALLY ABOUT WHAT YOU READ

There is much more to reading than simply understanding what the words on the page say to you. You can get many extra and deeper meanings by thinking about what is said as you read and after you read. Try to figure out exactly what the author meant in some of the statements that are not clear to you. Try to work out your own explanation as to why certain statements might be true.

Apply some of the statements made to your own life and experience. Question some of the author's statements if you like. Test the truthfulness of doubted statements by seeking further information in regard to them. When you do such things as these, you are doing *critical reading*.

The questions below test your critical reading of the selection on schools. Answer on a separate paper.

1. Do you think it is true that "schools are giving more and more service to the community these days"? _____
Check the truthfulness of your answer. One way of doing this is to list the services your school offers to the community. Then ask your mother and your father and several adults what services their schools offered the community. Compare your list with the different lists of services which they mention. Don't hesitate to change your answer if you think that you were wrong.
2. Exactly what did the author of this selection mean when he said "The future of our nation is being determined today in the school rooms of Canada"?

3. The author says, "In learning how to be good citizens in our community, our province, and our nation." What does he mean by this statement? Answer the question by naming three things that you learn to do in the classroom which help you to be a better citizen in your community, province, and nation.
4. You read that schools are supported by each province out of its taxes. What hardship might this work on children in some provinces? Do you think this problem could be met if the Canadian government were to help support the schools? Can you give one or two arguments against having the federal government help support the schools?

A flick of the switch and the classroom in today's school is flooded with light. It has not always been so. For centuries man burned some kind of fuel for light. The familiar saying of "burning the midnight oil" in order to study has little meaning in this age. a far cry from our well-lighted schools of today.

Do you know what kind of lights your school has? Perhaps it has two kinds. Some schools have one kind inside of the school building and another kind on the athletic field for night games. After reading the selection below, decide which kind or kinds of lights you have at your school.

This selection gives you detailed information about several things. It is packed with facts. You will frequently find this pattern in your *science* books. Follow the directions below and learn one way of studying such a selection.

In reading this selection take notes as you study it. Write your notes in outline form.

There are three major sections in this article. Each major section appears under a boldface heading. The section under the first boldface heading is

partly outlined for you on the form provided in Activity 1. On separate paper, copy and complete this outline for the first section. Then make an outline of your own for each of the other two sections.

1. Read the first heading in boldface type. This is the major heading which should be written in the outline opposite Roman numeral I. It has been written for you as an example.

2. Read the italicized subheads at the beginning of paragraphs under this larger heading. Write these opposite capital letters under the Roman numeral heading. The first one has been done for you.

3. Now carefully study the text about *The Carbon Filament Lamp*. Sort out the important details and write them opposite the Arabic numerals (1, 2, 3, and so forth) under the larger heading which you wrote opposite A. The first two details are written for you. Add others as you read and find them.

4. After finishing your outline for the first section, then continue to work in the same way as you prepare your own outlines for the second and third sections of the article.

DIFFERENT KINDS OF LIGHTING

THE INCANDESCENT LAMP

The incandescent lamp has been commonly used in lighting schools in the past. There have been two kinds of incandescent lamps: the carbon filament lamp and the tungsten filament lamp.

The Carbon Filament Lamp. The first incandescent lamp was invented by Thomas Edison in 1879. After many experiments he finally succeeded in making a lamp using a filament made of a thread of carbon. When an electric current was passed through this filament it become so hot that it gave off light, that is, it became incandescent.

This was promising, but the light didn't last long. In air this hot carbon thread would soon burn up and break the electric circuit. To prevent this from happening, Edison placed the filament in a glass bulb and

pumped out the air. Because no oxygen remained in the bulb when it was sealed, the carbon thread could not oxidize, or burn. Instead the filament continued to glow, giving off light as well as heat.

The Tungsten Filament. The carbon filament lamp was used for many years but was finally replaced with the tungsten filament lamp. It was found that a tungsten filament gave a whiter light than carbon and also gave more light for the amount of electricity used. The metal tungsten has a high melting point which makes it possible for a filament of this material to be heated to a very high temperature. It was also discovered that the tungsten filament would last longer if the bulbs were filled with a gas such as nitrogen or argon rather than remaining empty. The added pressure of the gas helps prevent the heated tungsten filament from evaporating. With these and other improvements the incandescent electric lamp has been and still is used widely. So many of these lights are used that their cost is quite low.

* Based upon material prepared for this book by Gordon E. Van Hooft.

incandescent (in'kăn dēs'ěnt): White or glowing with heat.
tungsten (tŭng'stēn): A metallic element belonging to the chromium family.

fluorescent (flōō'ō rēs'ěnt) lamp: An electric lamp the inside of which has a coating that glows when lit with ultraviolet rays.
filament (fil'á mēnt): A thread or a slender threadlike object.
circuit (sŭr'kit): The complete path of an electric current.
evaporating (ē vāp'ō rāt'ing): Passing off into vapor.

substance (sŭb'stāns): The material of which something is made.

phosphor (fōs'fōr): A substance that glows.

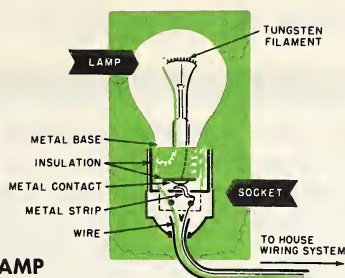
invisible (in viz'ī b'l): Not in sight; unseen.

advantage (ăd vān'tij): A condition favoring a desired end.

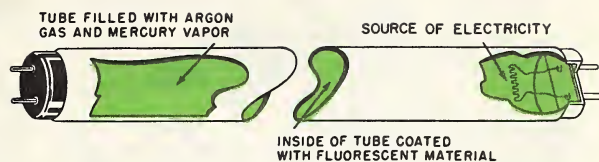
advertisement (ăd vār'tiz mēnt): A public notice.

identify (i dēn'tī fi): To find and recognize some specific person or thing.

Incandescent Lamp



Fluorescent Lamp



The light is more nearly like daylight than that of the incandescent lamp.

This lamp is cooler than the incandescent lamp.

OTHER KINDS OF LAMPS

The Sodium Vapor Lamp. The strong yellow light that comes from lamps along some highways is from sodium vapor lamps. These are excellent outdoor lights, especially in a fog. They are also the cheapest of all lights to operate.

Mercury Vapor Lamps. These lamps give off the best light to use in matching colors. Cloth and paper industries often use the mercury vapor lamp. The ultraviolet rays from this kind of lamp kill many kinds of germs. This kind of lamp also is used as a sun lamp. So we often find mercury-vapor lights in hospitals and doctors' offices.

Neon Lamps. The brightly colored advertisements made of bent glass tubes that glow are called *neon lamps*. There is only one color, however, when neon alone is used in the tubes. This color is a yellowish-red light. The different shades of blue are produced by mixing neon with other substances, such as argon or mercury. Sometimes the colors are produced by using different colors of glass in the tubes.

THE FLUORESCENT LAMP

How the Fluorescent Lamp Works. The fluorescent lamp has a shape which is quite different from the bulb of the incandescent lamp. The fluorescent lamp is a long glass tube, sealed at both ends. There is an electric connection at each end.

The inner surface of the tube is coated with a chemical substance called a *phosphor*. The air is pumped out of the tube. Argon and mercury are added.

When the electricity is turned on, the heat changes the mercury to vapor. The vapor gives off ultraviolet waves which are invisible. Although these waves are themselves invisible, they produce the light. When these invisible ultraviolet waves strike the phosphor coating, they cause it to glow brightly or fluoresce. Hence the lamp is called a *fluorescent lamp*.

Advantages of the Fluorescent Lamp. The fluorescent lamp is rapidly replacing the incandescent lamp because of its many advantages.

The fluorescent lamp uses less electricity. A 15-watt fluorescent lamp gives about the same amount of light as a 40-watt incandescent lamp.

The fluorescent lamp gives off a soft light over a larger area. The incandescent lamp gives a glaring light at one bright point.

ACTIVITY 1—TAKING NOTES

Use separate paper to copy and complete the outline below by taking notes as you study the article. Add more Roman numerals than those given in the instructions on page 84. Add more numbers under each A and B section as you need them. Outline the other two topics, also.

Different Kinds of Lighting

I. The incandescent lamp

A. *Carbon filament light*

- 1.
- 2.
- 3.

B.

- 1.
- 2.

ACTIVITY 2—IDENTIFYING KINDS OF LIGHTING

1. What kind of lighting is used inside your school? _____
2. What kind is used on your athletic field? _____
3. What kind is used in your home? _____

Applying What You Have Learned

Often in reading *science* you find material that is unlike other patterns. This distinct pattern is material in which you are given a mass of detailed information. One of the best ways to study such material is to outline, taking notes as you study. The outline will bring the facts into clear relief, and help you to understand what otherwise might appear to you as a confusing mass of details.

Save such outlines for review before examinations.

GROWTH IN SCHOOLS



A School in 1830



A Modern School

On this page you will have some experience in reading tables.

Tables are more difficult to read than graphs. In graphs the relationships are pictured for us. In tables we have to work directly with numbers, study-

Not all school problems are worked inside the walls of schools. People throughout Canada are interested in schools and education. Very careful records are kept of the number of pupils attending schools and money needed to keep the schools running. In studying the problems below, you probably will glean many new insights concerning the growth of schools and the number of students attending schools at different levels.

ing them carefully and making our own comparisons. Also in tables we often have several vertical columns of figures as well as horizontal columns. According to our purposes for reading a table, we find it necessary at times to read columns from left to right across the table and at other times from top to bottom of vertical columns.

In reading any table the first step is to read carefully and understand every word in the statement that tells what the table represents.

Next read and study all of the items in the first vertical column from top to bottom. Do the same with each of the other vertical columns in the table.

The next step is to read the headings of the different columns straight across the page to find out what each column represents.

Finally, answer the questions beneath the table. Do your computation on separate paper.

Teachers in publicly controlled schools in the Western Provinces, 1959-60

Provinces	Elem.		Sec.	
	Male	Female	Male	Female
Manitoba	1,013	4,046	1,225	792
Saskatchewan	1,565	4,942	1,246	584
Alberta	1,521	6,581	1,809	1,160
British Columbia	2,464	5,422	2,339	1,060
Totals	6,563	20,991	6,619	3,596

In the year 1959-60:

1. What was the total number of teachers in these four provinces? _____
2. How many female teachers, in both elementary and secondary schools, were there in the four provinces? _____

3. Which province reported the most female teachers? _____
4. How many male teachers were there in Manitoba? _____
5. Which province reported fewest male teachers in elementary schools? _____

Now you may do some problems in which you do not refer to a table.

1. Study each problem to find information needed to write under the headings in the chart below. Find and write the information called for.

2. So far you have had practice primarily on steps which will help you with *reading* and *studying* problems. Now that you are computing the problems, you should practice the additional steps which have to do with working the problem. After getting all of the information necessary for the first four headings under each problem, do these things:

a. Set the figures down on paper and make your computations carefully.

b. Compare your answer with the estimate that you made while reading the problem.

c. Check your computations.

1. In a recent year the increase in enrollment in publicly controlled and private schools was 190,380. If the average size of a class was 30, how many new classrooms would be needed for these additional pupils?

2. In 1871 there were 803,000 pupils in our schools. In 1901 there were 1,092,633 pupils in our schools, and in 1960 there were 4,751,017. What was the per cent of increase between 1871 and 1901? What was the per cent of increase between 1901 and 1960?

3. In 1871 there were 13,559 teachers in the schools of Canada, in 1901 there were 27,126, and in 1960 there were 164,843. What was the per cent of increase between 1871 to 1901? What was the per cent of increase between 1901 and 1960?

4. The estimated total expenditure on education in Canada in 1960 was \$1,442,000,000. The estimated amount for 1959 was \$1,338,000,000. Approximately how much more was spent on education in 1960 than in 1959?

5. In a certain year the total expenditure on public elementary and secondary schools in Canada was \$933,904,000. If the total average expenditure on each pupil was approximately \$290, about how many pupils were there in these schools?

Problem	To Find	Facts	Processes	Estimate	Answer
1.					
2. A.					
B.					
3. A.					
B.					
4.					
5.					

Applying What You Have Learned About Reading Problems

If you still have trouble with problems in your textbooks, continue to make headings for each problem or prepare a chart like the one on this page.

Then find all of the information for each of the headings. With this information you should be able to do the problem correctly.

WORKING WITH NEW ROOTS, PREFIXES, AND SUFFIXES

Origin and Meaning of a Few Words

In order to understand the meanings of some of the words in the next unit it will be helpful for you to know something about the origin and meaning of their roots.

Annual comes from the Latin word *annus* meaning *year*.

Capita is a plural Latin word meaning *heads*. *Per capita* means *by heads, for each individual*.

Cent comes from the Latin word *centum* meaning *one hundred*. *Per cent* means *by the hundred*.

Immune comes from the Latin word *immunis* meaning *exempt, safe, free from*.

Vaccine comes from the Sanskrit word *vasa* which in Latin became *vacca* meaning a *cow*. Hence Jenner called the substance made from cowpox antibodies a *vaccine*.

Body comes from the Middle English word *bodi*, and the Anglo-Saxon word *bodig*, meaning the *physical mass or substance* of a person, animal, or object.

New Prefixes

Two prefixes which have not been discussed before are:

anti: against, opposite en: in, into

Write one of these prefixes before each of the words below to make it mean the same thing as the definition to the right of it.

_____ gulf:	to swallow up, as in a gulf	_____ twine:	to twine into, twist around
_____ body:	a substance that fights against germs in the blood.	_____ social:	unwilling to mix with people.
_____ septic:	preventing the growth of germs	_____ freeze:	a substance to prevent freezing
_____ danger:	to put in danger	_____ act:	to make into a law

New Suffixes

Some suffixes which have not been discussed before are:

age: act, result of, rate of ize: to make
al: relating to, that which ous: abounding in

Write one of these suffixes after each of the words below to make it mean the same thing as the definition to the right of it. Omit final e or change y to e if necessary.

danger _____:	full of danger	organ _____:	to make organic, whole
person _____:	relating to a person	poison _____:	abounding with poison
wreck _____:	result of a wreck	percent _____:	rate of per cent
profession _____:	relating to a profession	education _____:	relating to education
immune _____:	make immune	nation _____:	relating to a nation
human _____:	to make human	symbol _____:	to make into symbols
pass _____:	act of passing	pound _____:	rate per pound
joy _____:	abounding in joy	mountain _____:	abounding in mountains
autumn _____:	relating to autumn	sterile _____:	to make sterile
beauty _____:	abounding in beauty	norm _____:	relating to a norm

REVIEWING PREFIXES AND SUFFIXES

On this page you will have a chance to build several words by adding prefixes and suffixes. All of the words that you will make are in the next two units.

Prefixes

Write one of these prefixes before each of the words below:

mis	inter	in	dis	un	ex
-----	-------	----	-----	----	----

_____bearable	_____fortune	_____national	_____ease
_____courage	_____skilled	_____active	_____cover

Write the words that you made in the blank spaces in these sentences:

1. Tom had the _____ of breaking his arm.
2. Mrs. Tompkin's headache was almost _____.
3. Mr. Holmes was suffering from a serious _____.
4. Interest in space travel is _____.
5. Perhaps man will _____ a new planet.
6. The laborer had not been trained to do any special kind of work. He was _____.
7. The Safety Council tries to _____ people from driving too fast.
8. Dr. Stuart no longer practices medicine. He is _____.

Suffixes

Write the suffix ion, tion, or ation at the end of each of the words below. Cross out the final e or y if there is one at the end of a word. Read all of the words you make, remembering that in all of these cases the tion is pronounced as if it were shun.

collect_____	situate_____	educate_____	organize_____
vaccinate_____	substitute_____	immunize_____	promote_____
populate_____	profess_____	occupy_____	inject_____

Add one of the suffixes in the box to each word below. Pronounce each word after you have added the suffix, and think how the suffix has changed the word's meaning. Cross out a final vowel if necessary.

ment	able	ly	ful	est	ance
------	------	----	-----	-----	------

treat_____	comfort_____	misery_____	meaning_____
gradual_____	enroll_____	tough_____	disturb_____

You have made several new words by adding suffixes. Choose one of the words that you have made to match each of the definitions below. Write the words on the line to the left of the definition.

_____ That which results from collecting _____ Having the feeling of suffering or misery _____ Putting things into a certain order or system	_____ A process or medicine used by a doctor in aiding a sick person _____ State of being content, at ease _____ Doing things by steps or degrees
--	---

FINDING MAJOR AND MINOR DETAILS

You have had much practice in finding the main idea of a paragraph and the important details that cluster around that idea. The important details which you have been finding are called major details. Sometimes, however, one of these major details has a cluster of lesser details that belong to it. These less important details that tell more about an im-

portant detail are called minor details. Can you tell the difference between a major detail and a minor detail? Can you see minor details as clustering around a major detail, rather than around the main idea of a paragraph, itself?

To have practice in doing these things, read the selection below, then do the activities on page 91.

A Great Canadian Educator

1. Probably no Canadian has done more to mould our educational system than Egerton Ryerson. One reason why he was able to make this contribution was the possession of a number of desirable personal qualities. Another reason was that the condition of the country was ripe for him to use these qualities. Mr. Ryerson was a man of unflagging energy working steadily for a generation to build the educational system of Ontario. He worked with dogged determination despite bitter attacks from his critics. He was an excellent administrator. He lived in the difficult times when the control of education was shifting from a local church school attended by a few students to a provincial system of government schools free to all children.

2. When Ryerson became Superintendent of Education for Upper Canada in 1844 most of the schools were operated by church groups or private organizations. The buildings were log structures crudely built and scantily furnished. For instruction the teacher used a meager and shabby collection of miscellaneous books. Few of the teachers had teacher education. Usually there were no grade levels, and students were given unexplained assignments to which they responded with unexplained recitations. Only a few children had an opportunity to attend school.

3. So Ryerson decided to make some changes. He had two thoughts in mind. First, he wanted to establish government schools for all. Second, he wanted to tour the schools of Europe. He felt that all children should be able to attend a school whose teachers had to reach a provincial standard of teaching. Ryerson also believed that he could obtain many excellent practical ideas from the European educational systems.

4. With these thoughts in mind, Ryerson toured many European countries as well as New York and the New England States. He found that the educational systems of Ireland, Germany, and Massachusetts gave him more practical ideas than those of other countries.

5. From each of these three places Ryerson took ideas, weaving them into the Ontario system of education. In Germany he saw the advantages of trained teachers and of a strong central administration. In Massachusetts he was impressed by the efficient work

of a board of trustees elected by popular vote. Ireland impressed him with its solution of religious difficulties in the schools and with its fine system of national textbooks. A provincial Normal School was established to train teachers and the central Education Department in Toronto provided strong leadership and control over the administration of education. Ryerson provided for the annual election of local Trustee Boards. He arranged for the selection and use of uniform and approved textbooks. He made provision for the use of the school for religious instruction. The local Board of Trustees was to set the time for the instruction and the manner in which it was to be conducted, and to name the instructor.

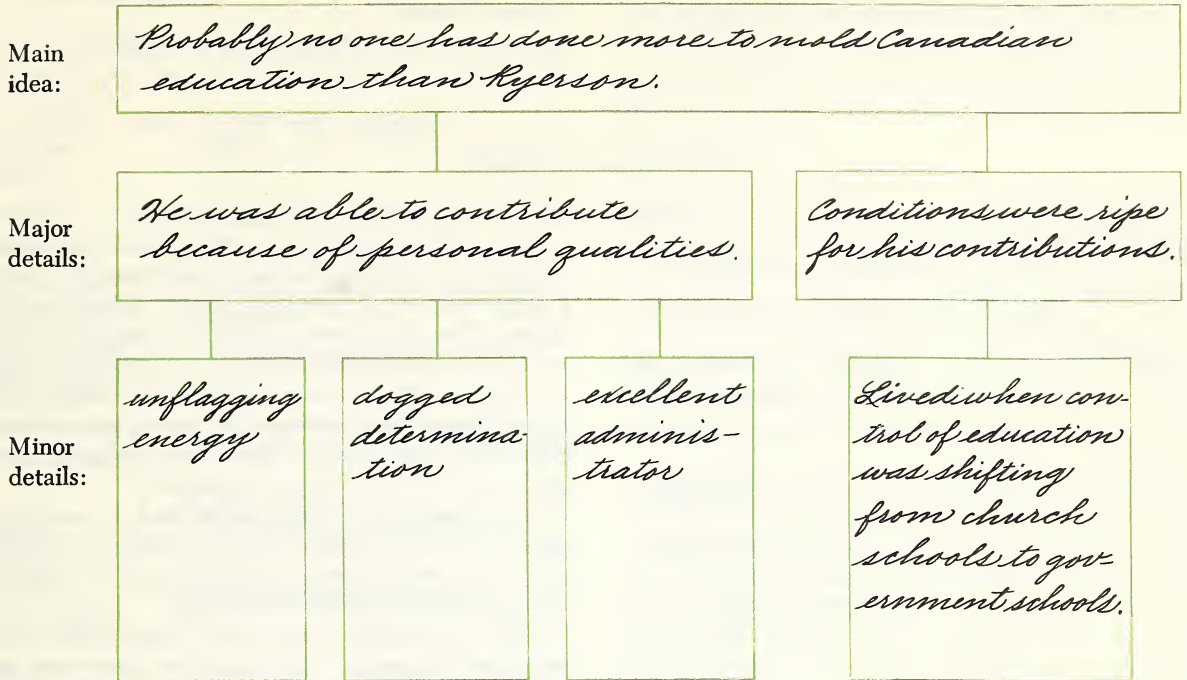
6. Throughout his career Ryerson was in close contact with the people of Ontario. He knew what they needed, and he often persuaded them to accept his suggestion before a fixed public opinion was established. When he was bitterly criticized in the Legislature he appealed directly to the men and women, and they sustained him in his decisions.

7. His understanding and concern reached to the classrooms themselves. He publicly condemned the frequent use of the rod and the superficial teaching. In its place he advocated the classroom practices of Pestalozzi who believed that learning begins with observation and perception of the object through the senses. Only when the object was known were word and arithmetical symbols to be introduced. Many objects were brought into the classrooms by the teachers, and the children were encouraged to use their senses to discover the identity of these objects and to learn their uses. In the place of harsh punishment Pestalozzi used a strict but kindly control of love. As the children in the classrooms of Ontario became more interested in their classroom work they were easier to discipline. Gradually, love and kindness were brought to the classrooms of Ontario.

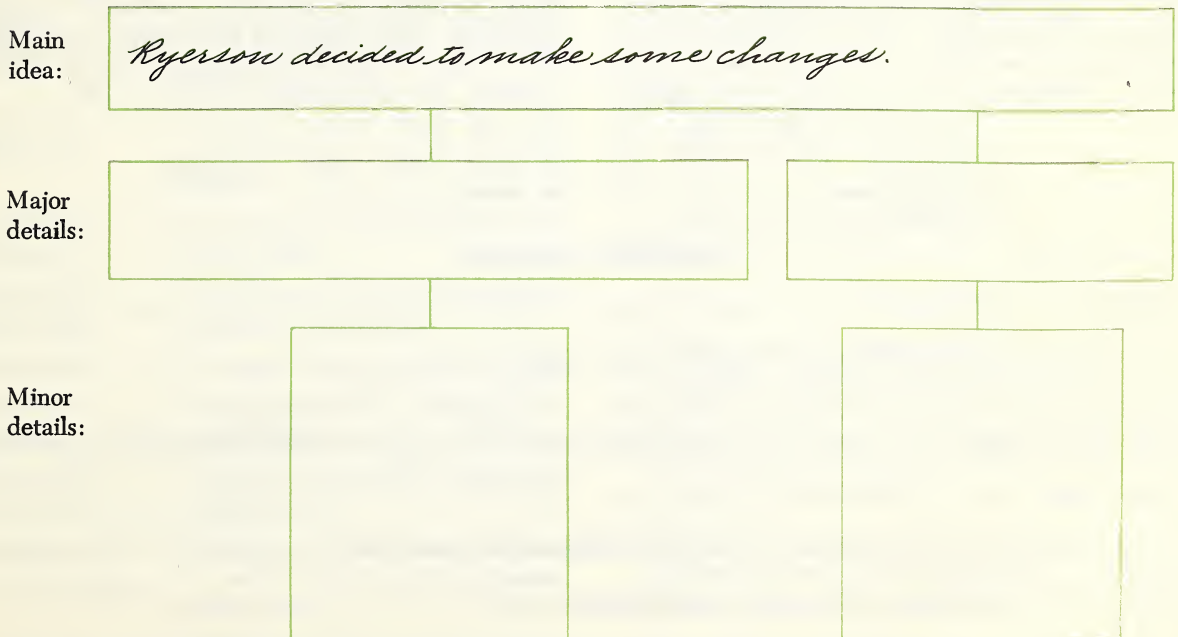
8. As the school system in Ontario became more efficient and effective other provinces adopted Ryerson's reforms. Soon his influence had been felt profoundly in every Canadian province. Truly Ryerson was a great Canadian educator.

Diagraming Major and Minor Details

A. Study the following diagram for paragraph No. 1. In it you can clearly see the main idea together with its two *major* details. You can also see the minor details that tell more about each of the major details.



B. Fill in the diagram below, which is planned for paragraph No. 3. The main idea is written for you.



C. Make a diagram for paragraph No. 5 by yourself.

DRAWING INFERENCES

In order to get the most out of our reading, we need to get many meanings from it that are not stated directly in the lines of print. These meanings, which we draw from a printed selection as the result of our own thinking and experience, are called *inferences*.

The meanings aren't stated. We simply *infer* them.

Read the short selection below. Then see if you can draw inferences to answer the questions at the bottom of the page.

You may time yourself in reading this selection.

Beginning time: Hr. _____ Min. _____ Sec. _____

Early Schools in Canada

There were no schools as we know them in Canada in the earliest times. The governments of both France and England left the education of the children in the hands of the clergy. These men and women gathered the youngsters, both white and Indian, around them for informal instruction. Spiritual instruction was given much attention although some reading and practical instruction such as rug-making and carpentry were given.

Gradually, during the 17th century, many elementary schools were formally established by the churches. Only a comparatively few children attended them. Some children of rich parents were sent abroad for their education and most of the poorer children were untaught until common schools, built by the parents and taught by a teacher whom they engaged, were brought into existence.

School houses were small. Usually they were made of logs and had but one room. Children of different ages and at many different levels of learning all worked together in this one room. The boys and girls sat on long, hard benches with no desks or tables in front of them. When they came up to recite to the teacher,

they had to stand in the front of the room.

If the children didn't know their lessons they were punished. Sometimes the teacher whipped them with a long whip or a wooden paddle. Sometimes he slapped their hands with a ruler. At other times he would have a child sit in a corner wearing a dunce cap.

Only three subjects were taught. These were reading, arithmetic, and writing. In reading the children memorized their A B C's. Then they memorized religious selections and verses in a primer.

In *arithmetic* the children memorized the combinations. Later they learned to add, subtract, multiply, and divide working only with figures. The teacher made up all of their examples for them.

When the teacher thought they were ready, they were taught to write. In those days there were no steel pens, and fountain pens were unheard of. Everyone wrote with quill pens made from feathers. The children brought their feathers from home. The teacher sharpened the larger end of each quill to make a pen point. The mothers of the children made their ink. It was a home brew of maple bark to which lampblack and iron sulphate had been added.

Ending time: Hr. _____ Min. _____ Sec. _____
Beginning time: _____
Total time: _____

No. words 385 × 60 = _____ WPM
No. seconds _____

INFERRING ANSWERS

1. What was a common school? _____
2. Why do you think rug-making and carpentry were taught? _____
3. Why did the children have to sit on long, hard benches instead of having comfortable furniture such as students have today? _____
4. What was missing from their arithmetic instruction which students have today? _____
5. Why was it a punishment to sit in a corner wearing a dunce cap? _____

Comprehension score: _____ Rate: WPM _____

INCREASING YOUR SCIENCE VOCABULARY

The words below are among those which appear most often in *science* books at your level. You will meet them frequently in your reading both in and out of school.

Say each word to yourself distinctly. Then read the meaning of the word and think about it as it is used in *science*.

concave Hollow and curved; curved inward.
kǒn'kāv

convex Curved or rounded outward.
kǒn'vêks

decompose To decay; to separate into simpler
dē'kǒm pōz' elements.

dehydration State or process of losing water.
dē'hī drā'shŭn

fermentation An internal motion; a chemical
fŭr'mĕn tā'shŭn change similar to that produced by
yeast.

fission A splitting or breaking into parts.
fīsh'ŭn

herbivorous Eating, or living on, plants.
hŭr bĭv'ô rŭs

inertia The property of matter by which it
īn ūr'shā will remain at rest, or remain in mo-
tion in the same direction, unless
acted upon by some force.

insulin A substance produced in the pan-
īn'sŭ lĭn creas which promotes the use of
sugar in the body.

ligament A tough band of tissue that con-
lĭg'á mĕnt nects the bones or holds an organ
in place.

lymphatic Pertaining to lymph glands or the
lĭm fāt'ĭk fluid in them.

masticate To grind or crush with the teeth to
mās'tī kāt prepare for swallowing.

neutralize To destroy the peculiar or oppo-
nŭ'trāl īz site properties of a substance; to
counteract.

omnivorous Eating everything, both animal and
ōm nĭv'ô rŭs vegetable food.

precipitation The process by which water falls to
prĕ sĭp'ĭ tā'shŭn the earth in the form of rain, snow,
hail, or sleet.

synthetic Artificially made out of parts; com-
sĭn thĕtĭk bined chemically to form a whole.

Probably you know how to pronounce many of these words already. But study the pronunciation of each one anyhow just to make sure that you know how to pronounce it correctly.

Choose one of the words in the column to the left to complete the meaning of each of the sentences below. Write the word in the blank space where it belongs.

1. When the bowl was turned upside down, its _____ surface was on the outside.
2. When food was placed in the bowl, the bowl's _____ side was used.
3. Nylon is a _____ cloth made of coal products, water, and the gases in air.
4. Cows eat only plants. They are _____ animals.
5. Sparrows eat both insects and seeds from plants. They are _____.
6. Mrs. James put the fresh berries in the refrigerator so they would not _____.
7. Yeast causes _____ in bread dough.
8. Pioneer women dried corn to preserve it. They used the process of _____.
9. The process used in splitting atoms is called _____.
10. All animals that have teeth _____ their food before swallowing it.
11. It rained very hard. The _____ was one and one-half inches.
12. Lymph is a colorless fluid contained in the _____ system.
13. If the pancreas is not producing _____ properly, a person is apt to have diabetes.
14. When Mr. Thomas fell he hurt his arm and strained the _____ that held two of the bones in his foot in place.
15. John had to overcome the _____ of the rock before he could move it.
16. When vinegar (an acid) and ammonia (a base) are mixed together, they _____ each other and form a salt.

UNIT SEVEN

SOLVING PERSONAL PROBLEMS



In the story below, Betsy met a great emergency coolly and efficiently. At the same time she solved a personal problem for herself. Find out what the emergency was, what the problem was, and how the two worked together.

Beginning time: Hr. ____ Min. ____ Sec. ____

BETSY SOLVES HER PROBLEM *

Betsy Morton was feeling sorry for herself. She stood watching the moonlight on the rippling water of the lake with tears rolling down her cheeks. She was running away from Camp Nokomis in the Okanagan Valley. Her father had bought the camp ten years ago for the family's summer home. Betsy was a baby of four at that time. Now she was a teen-ager, unhappy, disliking her family and nearly everyone else. She felt that she had no home anywhere. Nobody wanted her. She didn't belong. Even her mother had said so.

"I was counting on Betsy." There had been a sob in Mom's voice. "She has changed. She doesn't seem to belong any more."

Betsy had not heard her father's answer. Listening was a thing all the Mortons despised.

If she could have gone to Jane, it might have been different. Jane, a college freshman with dates and dances, had no time for Betsy. "Meet the kid sister," she would say carelessly to Tom, Dick, or Harry, the newest boy. They would nod as Betsy scowled back.

"Horrid manners you have," Jane would complain.

* Adapted from a story prepared for this book by Ivy Bolton.

John was no good. All he cared for was his chemistry set. And Timmy, the nine-year-old, was a pest. His tricks and his teasing were unbearable. She didn't like to have either one of them around.

Because Betsy disliked being with members of her family, she kept to herself most of the time. When she had to be with the family she did everything she could to bother them. She really did act as if she didn't belong. "I'll just run away from them all and go to Grandma's." That was her decision.

It was too early to go to the highway and catch a bus. She must wait till dawn. She didn't care to sit on the porch. Someone in the family might be there. So she followed a path quite a long way into the woods and sat down on an old stump, sullen and angry.

Suddenly there was a scream. "Sounds like Timmy," she thought as she leapt to her feet.

"He bit me! He bit me!" screamed Timmy.

Rushing down the path, she saw Timmy. A rattlesnake was coiled in front of him. For one moment Betsy stood frozen with horror. Then summoning her wits and her strength she snatched a stone and a heavy stick. A deadly struggle—and then the creature lay dead at her feet.

flushing (flūsh'ing): Blushing, turning red.

complain (kōm plān'): To express feelings of regret or pain.

hesitate (hēz'itāt): To delay.

comfort (kūm'fērt): To give relief or satisfaction.

serum (sēr'ūm): The colorless fluid of blood, often injected to counteract poisons in the body.

Betsy saw the poisonous marks on Timmy's bare foot. What could she do? Her emergency kit was at the house a mile away. Her father had the key to the boathouse and the doctor was across the Lake. Her mind went back to that afternoon last year when Grandma Heston had shown Jane and herself what to do for snake-bite—"if you've left your kit at home." She had shown them how to suck the poison out. Could Betsy do that? She *must*. She pulled Timmy to his feet, bound her handkerchief around his leg and began her unpleasant task.

"Betsy, can you get the poison out? Will I live?" sobbed Timmy frantically.

"Yes," said Betsy in a calm voice and continued on with her work.

"Oh, Betsy, you're good!" breathed Timmy between sobs. What a baby he looked to be with his tear-stained white face!

"Good?" Betsy felt the hot blood rush to her face. "A runaway. A coward. A troublemaker. And Timmy thinks I'm good!"

"Timmy! Betsy! What's going on?" Oh, what welcome voices. Dad and Mom were coming!

How fast things happened! Dad got the boat out. They sped across the Lake. Mom ran on to waken the doctor and Betsy helped Timmy up the path. A

swift examination and a cheery voice from the doctor.

"Right as rain, Mrs. Morton. She probably got the poison all out. But I'll give him some serum, anyhow."

Oh the joy of spinning back across the lake, whispering to Mom what she had done. Mom praising and comforting her. Timmy's hard little hand in hers, squeezing it while a wet kiss came on her cheek.

"You're a great pal, Betsy!"

"It would be nice to have a little brother for a pal, too," replied Betsy.

Dad understood. Mom understood. She was wanted. She was loved. She *did* belong. Timmy liked her now. Perhaps if she tried she could get John and Jane to like her, too.

When Betsy went to bed that night she faced her problem. "I've been unhappy because I made everybody else unhappy. When I did something kind for one of them, see how nice they were to me! I should be kind to all of them."

"I won't run away," she told herself. "I'll stay and work things out. I'll face things as they are. That's the way to solve my problem." Betsy snuggled down among her pillows. She must get rested fast for the new day. There would be so many things to do for other people. Betsy slept.

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:	_____	_____	_____

No. words 830 $\times 60 =$ _____ WPM
 No. seconds _____

COMPREHENSION QUESTIONS

- Where was the Morton camp? _____

- Why didn't Jane have any time for Betsy? _____

- Why did Betsy object to John? _____

- Why didn't she like Timmy? _____
- What did Betsy plan to do? _____
- What happened to Timmy? _____
- What had Betsy's grandmother told her to do for snake-bite? _____
- What did the doctor do for Timmy? _____

- Which members of her family did Betsy win back by saving Timmy? _____
- What did Betsy do when she went to bed that night?

Comprehension score: _____ Rate: WPM _____

DISCUSSION QUESTIONS

Write your answers on a separate piece of paper.

- What part of the story did you think was most exciting?
- At what time in the story do you think Betsy was most worried about Timmy?
- In what part was she most worried about herself?
- What first happened which caused Betsy to take stock of herself?
- Betsy had planned to stay up all night and catch a bus at dawn. Instead she slept comfortably in her bed. What change in her own thinking made this possible?
- How might the story have ended if Betsy had caught the bus to her grandmother's home?
- Who was braver, Betsy or Omar? Why? _____



THE PERSONAL PROBLEMS OF TEEN-AGERS

Some school libraries have a collection of pamphlets on solving personal problems. If you have a problem see if you can find some pamphlets on this subject in your school or public library.

In the story that you just read Betsy met the problem of feeling that she wasn't cared for by her family. Her problem was solved more or less by accident. Many other teen-agers meet their problems by direct attack. Read the selection below for suggestions.

1. Scan the boldface headings first.
2. Read the entire selection. As you do so, think

about yourself and how the statements made in the selection apply to you personally. Try to get some ideas in regard to how you might solve your own personal problems.

3. This is easy reading. See how fast you can cover the entire article and still find out how a person may solve his problems.

Beginning time: Hr. _____ Min. _____ Sec. _____

HOW TO SOLVE PERSONAL PROBLEMS

If you have a problem, start solving it at once. Don't puzzle and worry over it and do nothing. Take definite steps toward a solution. The steps below are good ones to follow.

DEFINE THE PROBLEM

If you are unhappy about something, think about the trouble carefully. See if you can "put your finger" on the cause. Try to state the problem in a few words. That is what Ted did in meeting his problem, as you will read below.

When Ted was in the first grade, his class started choosing him to take leading parts in the class plays. Ted enjoyed acting and decided that he wanted to be an actor after he had finished college.

Then, gradually, when he was in the eighth grade, his class began asking him to take very small parts in the plays. Finally he was not asked to appear in class programs at all. Ted was hurt and troubled and very unhappy.

Then one day Ted was fixing some scenery on a wing of the stage. Mary and Jean, who were standing on the other side of the wing, began talking. They did not see Ted as Mary said, "There is no one that could take the part of Rip Van Winkle as well as Ted. But of course we can't have him."

"No, of course not," replied Jean. "No one could

stand it, to look at that awful face of his all through the play. All those red pimples make you want to turn your head the other way. He'd spoil the whole play!"

Suddenly Ted's heart felt like lead. His lips were dry. His only thought was to get away where no one could see him. He had known that he had pimples for a couple of years, but he had paid no attention to them and he had thought nobody else did. Now he knew the truth!

That night when Ted went home he was a very unhappy boy. "If I look as bad as that, I never want to face my classmates again," he said to himself. "I don't even want to walk home from school with them."

Ted did go to school the next morning because he couldn't bring himself to explain to his mother why he shouldn't go. But he didn't look up when he entered the classroom; he didn't enter into discussion during class periods; he didn't talk to anyone at recess time.

Day after day went by and Ted withdrew more and more from the others, and became more and more miserable.

Then one day when he was in the library he caught sight of a pamphlet titled *Solving Your Personal Problems*. He pulled the pamphlet from its rack and began reading with high interest.

"The first step" the pamphlet said, "is to *define your*

pamphlet (păm'flēt): A book of a few sheets of printed matter.
discourage (dis kūr'ij): To dishearten; lessen the courage of.
analyze (ăn'á liz): To separate mentally the parts of a whole.
gradually (grăd'ŭ āl i): By a series of slow changes.
definite (dēf'i nit): Precise; in detail; fixed by limits.

miserable (miz'ēr á b'l): In a state of extreme unhappiness.
mingle (mĩng'g'l): To join in company.
situation (sit'ŭ ā'shŭn): State or position as related to something else.
misfortune (mĩs fôr'tŭn): Bad luck; bad fortune.

problem. Decide just what it is that is the cause of your trouble." Ted stopped reading and thought about his own trouble. Then he began to analyze his problem. "Those pimples!" he said to himself. "They're the cause of everything."

Ted had taken the first step. He had defined his problem.

THINK OF POSSIBLE SOLUTIONS

Ted read on in the pamphlet. "Once you have defined your problem, try to think of several solutions to it. This is the next step," advised the pamphlet.

"What possible solution could there be to my problem?" Ted asked himself. Then he went on with his thinking. "I could hide my pimples by placing powder, court plaster, or something like that over them. Maybe I could get some salve at the drugstore that would cure them. Maybe I should go to a doctor."

Ted had taken the second step. He had thought through to some possible solutions.

SELECT A SOLUTION AND CARRY IT OUT

Ted returned to reading the pamphlet. Its next advice to him was: "Select the solution which seems to

you to be the best one. Set about at once to carry out this solution. Stick to it until you get results."

He began thinking about the three possible solutions to his problem. "Anything I might put on my face would look worse than the pimples," he decided. "As for salve, I wouldn't know what to ask for. And I'm not sure a patent medicine is what I need anyway. A doctor is trained to take care of such things. He'd know what to do for me. I'm going to see a doctor," Ted finally concluded.

And he did. Ted had selected the right solution and he carried it out.

The doctor gave him medicine to take, and a powder to spread on his face each night. He put Ted on a special diet and told him how much time he'd have to spend exercising each day in the fresh air.

It was hard to do all of these things every day but Ted stuck to the doctor's program for him. After a couple of months his face began to clear up rapidly. Ted began to mingle with the other students again, talking and laughing with them. Spring came. Ted was chosen for the leading part in the end-of-the-year play. Once more his head was filled with hopes and plans to be an actor. Ted had solved his problem!

	Hr.	Min.	Sec.
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:	_____	_____	_____

No. words $\frac{870}{\quad} \times 60 = \quad$ WPM
No. seconds

Comprehension score: _____ Rate: WPM _____

ACTIVITY 1—SOLVING PROBLEMS

Below you will read about some other problems which boys and girls of your age have had. Read the first problem. Write a brief statement telling what you would do in each step while solving the problem.

Problem No. 1. Tom had trouble with reading, starting when he was in the first grade. When he got into high school the textbooks all seemed too hard for him. He would study for hours but he couldn't seem to understand what the pages of print said. He began to get C's and quite often D's and sometimes F's. All through the years Tom had planned to go to college. He wanted to be a doctor. Now he became greatly worried and discouraged.

Define the problem: _____

List possible solutions:

- _____
- _____
- _____

Which solution would you carry out? _____

On a separate piece of paper make an outline for each of the other problems like the one you used for Problem No. 1. Write your answers in each outline.

Problem No. 2. Marie was invited to a party. ' All of the other girls were buying lovely new evening dresses for the affair. Marie had \$5.00 which she had saved during the last three months. Her parents had heavy hospital bills to pay and couldn't give her any more money. The \$5.00 wouldn't buy a party dress.

Problem No. 3. As a little girl, Ann never wanted to mingle with the other students. She preferred to read, study, and play by herself. "Don't speak to her. She won't answer," she often heard the others say.

When Ann was in the grades everything seemed to work out just the way she wanted it to. But in high school it was different. The other students were going places and having good times. But Ann was never asked to go with them. She was missing out on all of the good times and fun. Now Ann began to realize that she had a problem.

Problem No. 4. Edward had the misfortune of being too fat. He was 15 years old, 5 feet 6 inches tall, and weighed 180 pounds! He had to wear clothes specially made for him. He never looked trim and neat. Everybody called him "Fatty." No one wanted him as a partner in games. He was very unhappy.

SCIENTISTS SOLVE PROBLEMS FOR ALL OF US



This man is filling a vial with poisonous fluid from the fangs of a rattlesnake. What do you think he will do with this fluid? How do you think it will be used?

You have been reading about ways to solve personal problems. Scientists not only solve the problems of individuals but also the problems of people in general.

In the selection below you will read about the solutions they have found in helping to save the lives of people who have different kinds of poisons in their bodies. This selection doesn't tell how the scientists discovered the problems, or what experiments they

carried on. It simply gives you facts about the solutions. This is a common pattern in your *science* books.

1. Read the title and the two boldface headings first to get an idea of the main topics to be discussed.
2. Read the selection for the purpose of understanding detailed facts. Find the main idea in each paragraph, and the major details that go with the main idea. If there are minor details, think of them as telling about the major details. Try to get the entire "picture" of each paragraph without stopping to underline or outline.

You will be checked on your grasp of detailed facts. You will need to do some additional thinking, however, because you will also be checked on inferences which you make about meanings not stated directly in the article.

3. Adjust your speed to reading for detailed facts. While this is a slow rate, you should be able to read more rapidly, even for details, than you did at the beginning of your work with this book. Time yourself in reading this selection.

Beginning time: Hr. _____ Min. _____ Sec. _____

FIGHTING TOXINS IN THE BODY*

THE BODY FIGHTS POISONS

1. Our bodies are often visited by unwelcome guests called *microbes*. The most common microbes are viruses and bacteria. These microbes produce poisons called *toxins*.

2. The blood contains two substances that fight germs. There are the tiny fighters known as *white blood cells*. These squeeze out of small blood vessels and mass at the site where microbes are at work. White cells destroy bacteria by engulfing them, much as a drop of water engulfs or takes in a particle of

dust on a window pane. In addition to the white blood cells, there are the antibodies in the plasma of the blood. As soon as a toxin produced by germs becomes present in the blood, an antibody begins to develop. Each kind of germ produces its own toxin. The blood produces a particular kind of antibody to combat each kind of toxin.

OUTSIDE REMEDIES FOR COMBATING MICROBES AND POISONS

3. The man whom you see above, in the picture, bred poisonous snakes as a way to make a living. In order to protect himself from the bites, he injected tiny amounts of snake venom into his body. The amounts were slowly increased over a long period of

* Based on an article prepared for this book by Maurice U. Ames.

virus (vī'rūs): A tiny particle that causes a disease.

toxin (tōk'sin): A poison formed by germs.

antibody (ān'ti bōd'ī): A chemical substance, made in the blood, that fights a particular kind of disease germ.

injection (in jēk'shūn): A liquid forced into the tissues of the body.

tetanus (tēt'ā nūs): A disease, commonly called "lockjaw," that affects the muscles of the jaws.

Dr. Jonas E. Salk (sāwk): An American physician, discoverer of a vaccine preventing poliomyelitis.

immunization (im'ū nī zā'shūn): Act of making free from a disease, or of the possibility of catching it.

vaccination (vāk'sī nā'shūn): The process of placing into the body dead or weak germs which produce a light attack of a disease; a person vaccinated is thereafter immune from a more serious attack of the disease.

venom (vēn'ūm): Poisonous matter which certain animals convey to human beings by biting or stinging.

inference (in'fēr ēns): A judgment; a conclusion logically made on the basis of facts or premises.

time until his body was able to withstand doses that would kill most people. This man is said to have developed an *immunity* to snake venom. How did he develop this immunity?

4. When the poison entered his body *antibodies* were produced which fought this particular poison. When the blood of a person contains enough antibodies to fight the poison from a snake, that individual will not be harmed seriously by a snake bite.

5. Antibodies for the treatment of snake bites usually are made for us by horses and goats. Healthy animals receive very small doses of the poison until there are large amounts of antibodies in their blood. Some of the blood is collected. It is allowed to clot. The red corpuscles are removed. A clear straw-colored liquid remains. This liquid, called *serum*, is rich in antibodies which combat snake poison. It is bottled and stored for future use. When necessary, this serum can be injected into a snake's victim and thus help combat the venom.

6. The process of injecting a serum or vaccine into the body to prevent disease is called *immunization*. When these substances cause a person's body to build up antibodies against a disease, then he is immune to the disease. Most serums are made from the blood of horses or other animals whose bodies have been infected with a particular disease. Serums are used in preventing diphtheria and tetanus. Tetanus is a painful disease caused by microbes entering deep cuts or wounds.

7. A *vaccine* contains dead or weak microbes of a particular disease. When a vaccine is injected into a person's body, antibodies begin to develop. A person thus vaccinated rarely gets this disease. In this way people can be immunized against diseases such as smallpox, typhoid fever, and whooping cough. This protection may last for a few years. Recently, the crippling disease of "polio" has been fought successfully by the Salk vaccine. This vaccine contains dead polio virus.

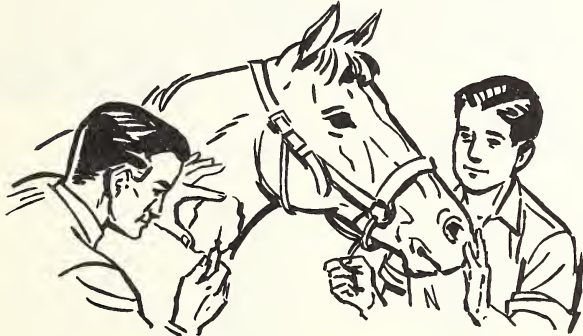
	Hr.	Min.	Sec.	
Ending time:	___	___	___	No. words $\frac{520}{\quad} \times 60 = \quad$ WPM
Beginning time:	___	___	___	No. seconds _____
Total time:	___	___	___	Comprehension score: _____ Rate: WPM _____

ACTIVITY 1—DIAGRAMING MAJOR AND MINOR DETAILS

Diagram paragraph No. 2 to show its major and minor details. Use a separate piece of paper for this work. Your diagram should be similar to A on page 91, except

that you should have two minor details under your first major detail, and three minor details under your second major detail.

ACTIVITY 2—DRAWING CONCLUSIONS FROM PICTURES



These pictures are related to the article you read above. "Read" the pictures and draw your own conclusion concerning each one of them.

In what important way is this horse serving human beings?

This boy has a deep cut in his foot. Why is the doctor giving him an injection?

_____	_____
_____	_____
_____	_____

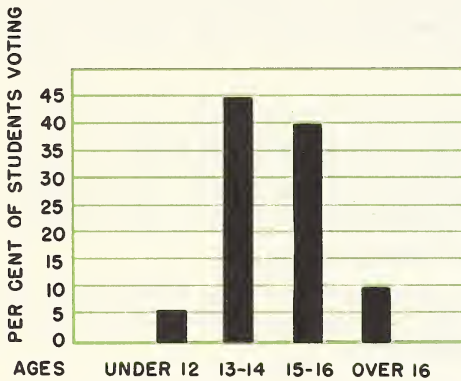
READING GRAPHS AND TABLES

The reading of graphs and tables requires special skills. With guided practice in using these skills, you will be able more quickly to grasp numbers and number relationships presented in these ways.

READING THE BAR GRAPH

The bar graph is used to show comparisons among different quantities.

The axis which runs up and down on the left side is called the *vertical axis*. The line running across the bottom of the graph is called the *horizontal axis*. In order to understand a bar graph you must be sure to *read* what each axis represents, as well as the heading above or below the graph.



Poll of High School Students on
Age to Begin Dating *

1. What does this graph represent? _____
2. What do the figures on the vertical axis mean? _____
3. What does the horizontal axis mean? _____
4. At what age bracket do most pupils in this high school think that they should start dating? _____
5. What two age brackets were favored by the fewest students? _____

What per cent voted for this age? _____

5. What two age brackets were favored by the fewest students? _____

* Based on information from the Dominion Bureau of Statistics.

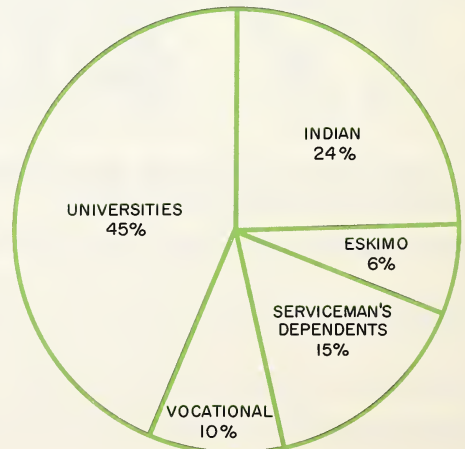
READING THE CIRCLE OR "PIE" GRAPH

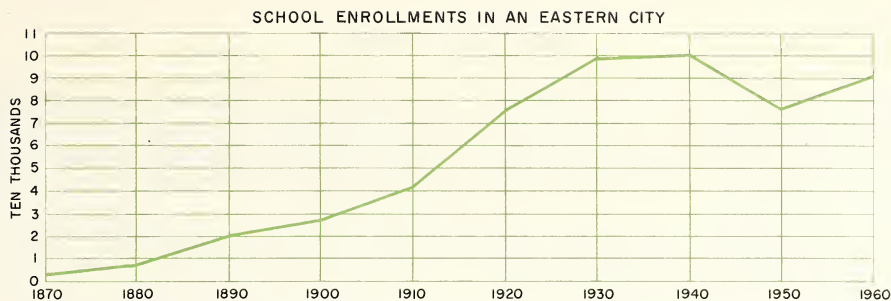
The most common kind of a "part-whole" graph is the circle or "pie" graph. In such a graph each section of the circle represents a part of the whole number. Usually a statement above or below the graph tells what the whole circle represents. The label on each part of the circle tells for what each part stands.

As in reading the other types of graphs your first and most important step is to read the statement above or below the graph which tells what the circle represents. Then study the labels and numbers on the sections.

1. What does the entire circle represent? _____
2. Which group gets the largest amount of money? _____
What per cent of the whole expenditure goes to this group? _____
3. What is the next largest expenditure? _____
4. How do these two groups compare with each other in terms of percentage? _____
5. What part of the total expenditure is devoted to the dependents of servicemen? _____

Federal Expenditure
on Education—1958 *





READING THE LINE GRAPH

The line graph, like the other graphs, has a statement above or below it telling what it represents. It also has a vertical and a horizontal axis each of which represents a series of important numbers. The first thing to do in reading a line graph is to get the information that is given in each of these three places.

1. What is the subject of this graph? _____
2. What do the numbers on the horizontal axis represent? _____
3. What do the numbers on the vertical axis represent? _____

4. How many tens of thousands of students are represented by the space between the numbers on the vertical axis? _____
5. How many smaller spaces are marked off between each two numbers on the vertical axis? _____
6. How many students are represented by each of these smaller spaces? _____
7. About how many students attended school in 1890? _____
8. About how many attended school in 1930? _____
In 1940? _____

READING TABLES

In reading any table the first step is to read carefully and understand every word in the statement that tells what the table represents.

The next step is to read the headings of the different columns straight across the page to find out what each column represents.

Next read and study all of the items in the first vertical column, from top to bottom. Do the same with each of the other vertical columns.

Do these things in studying the table below. Then make the comparisons asked for.

One Yardstick of Economic Advance *

Here's how real income per capital has increased during the past thirty years.

<i>Year</i>	<i>National Income</i> (millions of dollars)	<i>Population</i>	<i>Per Capita</i> <i>National Income</i>
1930	4,399	10,208,000	431
1940	5,063	11,381,000	445
1950	14,161	13,712,000	1,033
1960	27,154	17,870,000	1,520

Make some comparisons among the columns.

Suppose you wish to compare the gains made during the period of 1930 to 1940 with those made during the period of 1940 to 1950 in all three items—national income, population, and income per capita.

Study the last three figures in each column in terms of the amount of gain made. Subtract one figure

from another in each column, if you like, and compute the percentage of gain for each item. Then compare these percentages.

What general conclusion do you draw about the increase in national income during the 1940-50 period as compared with the increases in population

and in per capita income? _____

* Source: "National Accounts, Income and Expenditure, 1926-56" and "1961."

USING A DICTIONARY

You have studied the sounds of letters, the dictionary respelling of words, dividing words into syllables, accent marks, and different meanings of the same word. The dictionary uses all of these helps

in giving you information when you look up a word in that reference. See how well you can make use of all of these aids in working with a page from *Webster's New International Dictionary*.*

Study the dictionary page on the right to find the answer to each of the questions below. Write the answer on the line to the left of the question.

Pronunciation and Meanings of *Plantation*

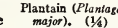
- _____ 1. What sound does the first a have in the word *planta-tion*?
long a short a schwa sound
- _____ 2. What sound does the second a have?
long a short a a as in *care*
- _____ 3. What sound does the tion have, as shown in the respelling?
ation ion shun shon
- _____ 4. How is the word divided into syllables?
plant a tion plan ta tion plan ta ti on
- _____ 5. Where is the accent mark placed? before plant after tion after ta
- _____ 6. What letter in this word has the schwa sound in the respelling?
the letter a the letter t the letter u
- _____ 7. How many meanings are given for *plantation*?
ten three nine six
- _____ 8. Which of the dictionary meanings is used in the next sentence? "In the West Indies many people work on sugar plantations."
No. 1 No. 8 No. 4 No. 6
- _____ 9. Which of the dictionary meanings is used in the next sentence? "Tom visited a fish plantation in Newfoundland."
No. 4 No. 9 No. 2 No. 8

Pronunciation and Meanings of *Plasma*

- _____ 1. What sound has the first a in *plasma*?
long a short a a as in *arm* schwa sound
- _____ 2. What sound has the second a in *plasma*?
long a short a schwa sound
- _____ 3. What sound has s in *plasma*?
hissing sound soft c sound of z
- _____ 4. Where is the word divided into syllables?
between pl and as
between s and m
between m and a
- _____ 5. Where is the accent mark? at the end of the word between pl and as between plas and ma
- _____ 6. How is the word respelled to aid you in pronouncing it?
plas mau plaz ma platz ma
- _____ 7. How many meanings are given for *plasma*?
two six four three
- _____ 8. Which of the dictionary meanings is used in the next sentence? "While digging for silver, the miners drilled through several layers of plasma."
No. 3 No. 1 None of them No. 2
- _____ 9. In how many branches of *science* does *plasma* have a different meaning?
3 4 1 2

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plasma + Gr. *aphairesis* a taking away.] *Physiol. & Med.* Removal of blood plasma; esp., the removal of a large quantity of blood from a living animal, separation of the


$$A_k = 1 - \epsilon_k + \epsilon_{k+1}$$

A bird of the fam

UR.

Attorella uniflora

ITTORELLA.

squirrel (*Sciuru.*

LANT.] Belonging

Keywords: child sexual abuse; disclosure; self-blame

New Page

now here.

anno. See 2d PLAN

ruit. Obs.
 mic. fr. plants th

& Zool. Of or per

1. A. J. A. A.

branches into which
The lateral plants

the dorsalis pedis

of fibre tissue, 1.

of fibrous tissue between the bones.

s membrane of the

super structures.

FINDING THINGS IN A LIBRARY

Finding a Book on the Open Shelves

Many libraries have a room with books on open shelves. The Dewey Decimal System aids you to find a book in such a room quickly. In this system books are numbered according to subjects.

Here are the 10 classes of the Dewey Decimal System, and the numbers for each.

000–099 General Works	500–599 Science
100–199 Philosophy	600–699 Useful Arts
200–299 Religion	700–799 Fine Arts
300–399 Social Science	800–899 Literature
400–499 Language	900–999 History

In finding a book, you first decide in which subject field it comes, then go directly to the shelves that have books bearing the class number of that field.

After you locate the section in which your book is placed, you will find that the books are organized within the section by an author number in which a letter is placed before the numbers. This letter is the first letter of the last name of the author.

These are the two numbers on a book called *Origins of Word Meanings* by Joseph T. Shipley: $\begin{smallmatrix} 421 \\ S12C \end{smallmatrix}$. Answer the questions below about this book.

1. In which of the Dewey classifications is this book? _____

2. What does the S stand for in the second number? _____

Give the Dewey numbers and the name of the subject field in which you would find each of these books:

3. *Bacteria and Microbes* by Gene Tompkins _____

4. *Poems of Our Times* by Sharon Brown _____

5. *Everyone Can Paint* by Lola Green _____

Finding Books in the Card Catalog

A non-fiction book is listed in three different ways in a card catalog: by its author, under its title, and according to its subject. Here is the listing of a book as it would appear on three different cards.

Author Listing: 520 Hoffman, Thomas *Defenses Against Bacteria*

Title Listing: 520 *Defenses Against Bacteria* Hoffman, Thomas

Subject Listing: 520 *Bacteria, Defenses Against* Hoffman, Thomas

Underline the right answer to each of these questions:

1. If you were interested in a certain subject such as *antitoxins*, and you didn't know the title of a book on this subject, or the name of an author who had written on this topic, which listing would you use in locating some references in the card file on this subject?

(a) title listing, (b) author listing, (c) subject listing

2. If you knew the name of an author who had

written a book on this subject, but didn't know the name of the book, which listing would you look for?

(a) title listing, (b) author listing, (c) subject listing

3. If you knew the title of a book on this subject but didn't know the author's name, which listing would you look for?

(a) title listing, (b) author listing, (c) subject listing

Write the three different listings which you might find in a card catalog for a book entitled *The Sun* by Herbert Spencer Zim. Supply the right Dewey System number, also.

4. Author listing: _____

5. Title listing: _____

6. Subject listing: _____

SKIMMING WITH THE USE OF KEY WORDS

In one kind of skimming you sweep your eyes over the page as fast as you can, paying no attention to anything but important words.

Skim the article below. See how much you can get out of this selection by *rapidly* glancing through it to grasp meanings given by the key words.

Louis Pasteur

Louis Pasteur . . . French scientist . . . laid . . . foundation . . . the study . . . disease. . . first . . . experiment was . . . find . . . where bacteria came from. . . made . . . flask . . . , curved neck. . . filled it . . . broth. . . boiled . . . broth . . . to kill . . . living organisms that . . . in it. . . sealed . . . flask. . . did not spoil. Later . . . let . . . dusty air into . . . flask. . . broth spoiled. So Pasteur decided . . . bacteria lived . . . dusty air.

Pasteur discovered . . . preventive treatment . . . illness following . . . bite . . . mad dog. Rabies . . . disease following . . . bite . . . dog destroys . . . spinal cord. People . . . France feared . . . disease. . . appealed . . . science . . . find cure.

Pasteur took spinal cord tissues . . . animals . . . died of rabies. . . dried . . . for different period . . . time. . . then made inoculations . . . tissues . . . injected . . . animals . . . rabies. . . tried . . . over . . . again until . . . found . . . right dose . . . cure.

He didn't . . . try . . . remedy on human . . . But . . . practically forced nine-year-old boy . . . bitten . . . mad dog . . . 1885. . . name . . . Joseph Meister. Joseph's mother begged Pasteur . . . save . . . life. Pasteur treated wounds boy . . . not have rabies. Joseph . . . first . . . saved . . . treatment.

Pasteur also found . . . way . . . prevent . . . disease . . . killed . . . cattle . . . sheep . . . Europe. . . disease . . . *anthrax*. . . . inoculated healthy animals . . . weakened culture . . . anthrax microbes. These . . . animals . . . mild form . . . disease. After that . . . immune . . . disease.

Many scientists . . . not believe . . . Pasteur's remedy prevented . . . So Pasteur gathered forty-eight sheep . . . several cows . . . goats together . . . pasture. Half . . . animals . . . immunized . . . cultures . . . weakened anthrax microbes. Then all . . . injections . . . strong microbe cultures. . . animals . . . not been immunized died . . . few days. Those . . . received inoculations . . . weakened microbes lived. . . definitely proved Pasteur's theory.

. . . silk industry . . . France . . . suffering great loss . . . disease killed silkworms. Pasteur . . . asked . . . way . . . preventing . . . disease.

After much research . . . there . . . two different diseases . . . killing . . . silkworms. . . bacteria . . . diseases formed . . . mulberry leaves . . . silkworms ate. As . . . result . . . eating . . . leaves . . . bacteria . . .

silkworms transmitted . . . diseases through . . . eggs . . . next generation. Pasteur found . . . identifying diseased eggs . . . worms. . . also . . . prevent bacteria . . . mulberry leaves. With . . . information . . . silkworm breeders . . . able . . . save . . . silkworms . . . silk industry . . . flourished. . . Pasteur saved France millions . . . through . . . discoveries . . . silkworm diseases.

Milk . . . valuable food. It may . . . dangerous drink, however, because tuberculosis . . . , scarlet fever, . . . typhoid . . . disease germs may develop in it. Pasteur discovered . . . germs . . . killed . . . heat. . . . urged people . . . heat . . . milk before . . . drank word *pasteurized* . . . now used . . . name . . . process . . . milk . . . kill germs.

Companies . . . sell milk . . . pasteurize it. According . . . process . . . milk . . . heated . . . temperature . . . about 150 degrees Fahrenheit . . . 30 minutes. . . rapidly chilled.

. . . next time . . . see . . . bottle or cardboard container . . . milk, look for . . . word *pasteurized* . . . sides. . . be grateful for . . . work of . . . great scientist, Louis Pasteur.

Write "Yes" or "No" before each of these questions:

- _____ 1. Louis Pasteur was an English scientist.
- _____ 2. His first experiment was carried on to find out what caused a disease of silkworms.
- _____ 3. When he boiled broth and sealed it in a flask, it did not spoil.
- _____ 4. He made his inoculations for rabies out of the dried blood of animals who had had the disease.
- _____ 5. Pasteur first tried his treatment for rabies on a human being at the request of the parents of the person who had been bitten.
- _____ 6. Pasteur proved his theory for preventing anthrax by inoculating half of a group of animals and then injecting strong microbe cultures into all of them.
- _____ 7. He found that there were two bacteria diseases that were killing silkworms.
- _____ 8. Pasteur set up a milk factory and pasteurized all the milk in France.
- _____ 9. He found a way of making silkworms spin more silk.
- _____ 10. Pasteurized milk of today is heated to a temperature of 150 degrees.

WORKING WITH WORDS OF MULTIPLE MEANING

Some words have different meanings when used in different subject fields. You will find words of this type in the lists below.

Read the first definition and the name of the subject to which the definition applies. Choose a word from the list that goes with that definition. Do the rest of the page in the same way. See if you can match each word with its meaning in a special field.

graft
organ
neutral
draft

motion
revolution
trust
process

shoot
culture
meter
beam

pupil
duty
range
base

_____ In *science*: to place a bud of one plant into the branch or root of another plant to produce a union of the two plants.

_____ In *social studies*: to make personal profits by unfair means.

_____ In *science*: the complete turning of a body around its axis.

_____ In *social studies*: overthrowing a government or ruler by those governed.

_____ In *science*: a compound capable of acting with acids to form salts.

_____ In *social studies*: a place where troops or supplies are stationed in wartime.

_____ In *mathematics*: the side of a triangle or other figure on which the figure rests.

_____ In *social studies*: a combination of firms controlling the policy of all firms belonging to the combination.

_____ In *arithmetic*: to give credit relying on future payment.

_____ In *science*: a part of the body which performs some specific function.

_____ In *music*: a musical instrument.

_____ In *science*: a series of actions or changes that moves toward some definite end or result.

_____ In *arithmetic*: the act of addition, subtraction, multiplication, or division.

_____ In *science*: neither positive or negative; neither acid nor base.

_____ In *social studies*: not taking part with either of two contending parties.

_____ In *science*: a cultivation of bacteria or fungi in a prepared nutrient.

_____ In *social studies*: a stage of advancement in civilization.

_____ In *geography*: a series of mountain peaks in a connected system.

_____ In *mathematics*: values covered in a system of numbers arranged in order from highest to lowest.

_____ In *social studies*: a boy or girl in the elementary grades in school.

_____ In *science*: a part of the eye.

_____ In *mathematics*: a measure of length in the metric system.

_____ In *literature*: the systematic arrangement of rhythm in a verse.

_____ In *social studies*: to discharge a gun.

_____ In *science*: a young growth or sprout on a plant.

_____ In *social studies*: to select men for compulsory service in an army, navy, or air force.

_____ In *science*: a current of air.

_____ In *mathematics*: an order from one person to another, directing the payment of money.

_____ In *social studies*: a suggestion in a formal meeting that some action be taken.

_____ In *science*: the act or process of changing place or position.

_____ In *social studies*: that which a public official is expected and bound to do.

_____ In *mathematics*: the sum of money required by law to be paid on imported or exported goods.

_____ In *social studies*: a heavy piece of timber or metal used in building.

_____ In *science*: a ray of light.

INCREASING YOUR MATHEMATICS VOCABULARY

The words below are among those which appear most often in *mathematics* books at your level, and which you haven't had in preceding books in this series.

Probably you know how to pronounce many of these words already. But study the pronunciation of each one anyhow just to make sure that you know how to pronounce it *correctly*.

Pronounce each word to yourself saying it distinctly. Then read the meaning of the word and think about it as it is used in *mathematics*.

factor
făk'tēr One of several quantities or symbols which, when multiplied together, form a product.

fee
fē That which is granted or paid as due.

micrometer
mī krōm'ē tēr An instrument used with a microscope or telescope to measure minute distances.

notation
nō tā'shŭn A system of figures, letters, or signs used in *arithmetic* or *algebra*.

protractor
prō trăk'tēr An instrument for laying down and measuring angles on paper.

quotation
kwō tā'shŭn In stocks, a statement of selling price.

refund
rē fŭnd' The money given back because of overpayment or defective goods.

security
sē kū' rī tī State of having sufficient money to take care of one's self.

solvent
sōl'vent Able to pay all legal debts.

speculation
spēk'ū lă'shŭn Act of taking a chance at making a profit by entering into a business with unusual risks.

statistics
stă tis' tiks Classified facts concerning some condition.

stocks
stōks Shares owned by individuals in the capital of an incorporated business.

survey
sēr vā' Exact measurement of any part of the earth's surface.

trust
trŭst To rely on future payment for merchandise.

wholesale
hōl'sāl' Of, pertaining to, or engaged in sale of goods in quantity for resale.

yield
yēld The amount of a product resulting from growth or cultivation.

See how well you know the meaning of the words with which you have been working. Choose one word to write in each of the blank spaces below.

1. The Smith Canned Goods Company sold its products only in _____ lots to retailers.
2. The _____ for parking John's car was \$1.50.
3. The apple tree in Mr. Wood's yard gave him a _____ of four bushels of apples.
4. Two neighbors had a dispute over their boundary line. They called some experts in to make a _____.
5. The stock _____ for Cal Steel is 47 4/8.
6. Here is an example: $7 \times 8 = 56$. In this example 8 is a _____.
7. Mr. Snow was saving his money so he would have _____ in his old age.
8. Mr. Black wanted to buy \$500.00 worth of goods on credit. He said, "Will you _____ me for three months?"
9. Jane was beginning the study of angles. She had fun using her new _____.
10. Harold made a report on _____ he had read about floods in Manitoba.
11. Mr. Jordan had some money to invest. He bought _____ in two companies.
12. The astronomer used a _____ to measure distance.
13. The Romans used letters in their system of _____.
14. The table that Mrs. Jones bought was badly damaged. She asked for a _____.
15. No one knew whether stocks in Home Drug Company would go up or down. Mr. Gates bought several shares as a _____.
16. Mr. Decker could pay all of his debts when he closed his business. He was _____.

UNIT EIGHT

CHOOSING A VOCATION

What kind of work do you want to do when you have finished your education? Have you thought much about your career?

Bill Murray decided that he wanted to be a helicopter test pilot. It was dangerous work and Bill had some serious accidents.

As you read this story imagine that you are Bill. Think how you would act and feel if you were having the same experiences that Bill had. At the end of the story decide whether you would have said what Bill said about his job.

Read the story as fast as you can and still enjoy it.

Beginning time: Hr. _____ Min. _____ Sec. _____

HELICOPTER TEST PILOT *

Chief Test Pilot Bill Murray eased off throttle, and the giant rotors of the CF-OGK helicopter slowed. He “cleared” himself—the sky over the testing field was free of traffic. He checked his instruments once again. Air speed dropping, altimeter needle pointing to the 1,500-foot mark. Engine and controls were ready.

Then, moving carefully in the maze of tiny wires that wound through the cockpit, Bill heeled the control stick hard to the left.

The helicopter rolled to her left—then trembled, snapped back, and plunged toward the ground. A piece of broken rotor blade sailed away in a crazy flight of its own.

Out of balance, the rotors turned faster and faster. The cockpit whipped back and forth. Bill Murray obeyed his first thought in a “washed out” ship: He unfastened his safety belt and scrambled to the hatch.

The bucking helicopter slammed him back. He rolled over and struggled to free his arms from the tangle of wires. One of the board instruments tore loose and crashed against the hatch. The helicopter nosed toward the runway.

Too low now to bail out, Bill crawled into the bucket seat and fought to hold himself there.

Straight to the ground plowed the helicopter. Bill’s foot went through the metal flooring. His body was thrown twenty feet in front of the wreckage. In the silence on the runway, he found he could move only one arm.

“But,” says Bill now, “all I got out of it was some bad scars, concussion of the brain, and a broken back.”

That’s all! And he was back in the cockpit two weeks after he left the hospital. Still in a brace, he helped “test out” the new model of the same rotor blade that had caused his accident.

For that’s the test pilot’s job—to explore the unknown, to find out why. “And we’ve still got plenty to learn,” says Bill. “One of the toughest jobs in aviation is riding an eggbeater that wants to tip over. Fly-

throttle (thrōt’l): The valve controlling the fuel charge to the cylinders.

rotors (rō’tērz): Long rotating blades on a helicopter.

altimeter (āl tīm’ē tēr): An instrument for taking altitudes.

fleece-lined (flēs’ lind’): Lined with sheep’s wool.

concussion (kōn kūsh’ūn): A lowering of activity in an organ produced by shock.

hatch (häch): An opening in a floor, covered with a trap door.

whoosh (hwōōsh): A word used to imitate the sound of a rising helicopter.

ing these eggbeaters is too new. We're about even with the Wright brothers."

At another time Bill had an accident while some Army officials were watching him. They had asked to see the *CF-HTK* in action.

It was cold and sunless outside Bill's office window when the call came in. Bill pulled on his electrically heated flying gloves, fleecelined flight suit, and fleecelined boots. He jotted time, date, temperature, and atmospheric pressure on his flight pad as he walked down the flight line.

Up into the model he climbed and settled into the bucket seat. Helpers assisted him to fasten his safety belt and strap on his custom-built crash helmet.

Then they scrambled down and gave him an "all clear." Fuel was on, electricity was on, mixture was rich. Bill flipped over the starter switch.

With the engine ticking smoothly, he released the clutch. Slowly, the long rotors came around in front of him and disappeared in back. Faster and faster. The rotors seemed to melt away and their "whoosh, whoosh" became a steady whir.

A touch of throttle and he could feel the power surging into the rotors. Then, twisting the throttle grip gently, he eased back on the pitch stick. The *CF-HTK* swayed and pulled herself free.

With the rotors churning, Bill pulled up past the Army "brass" and swung on out the runway. At the far end, he eased his *CF-HTK* into a 180° turn to the left and nosed down for more speed.

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:			

Far ahead, he could see the officers standing in the snapping Manitoba wind. He banked slightly to his right and barreled toward them.

Then, at 110 mph, just forty feet from the ground, he lost not one, not two, not three, but all four rotor blades. His helicopter flipped over twice, bounced, and skidded to the feet of the frightened onlookers.

Test pilots have a saying, "It's not the speed that kills you, it's the drop." This time the doctors patched Bill with a Band-Aid.

Ask Bill Murray why he suffers through such nerve-racking experiences and still sticks to the job, he'll say, "There's a future in helicopters. Not only for pilots like me, but for anyone who wants to build them, sell them, or service them. I have faith in this job and I like it."

What Bill means about the future of the helicopter is that this type of aircraft slowly is "taking over" most of the world's carrying jobs. Already it serves the jet, which soon won't be able to land at "close in" airports. It carries passengers of jets from far-out airports into city and rooftop heliports.

It rescues flood victims and brings supplies to aid people living in mountainous or desert areas far from towns. It sprays crops, orchards, and forests with insecticides. It discovers forest fires and delivers mail.

Today the helicopter does dozens of things that man has always dreamed of doing in the air. And because men like Bill Murray are risking their lives to make it safer and more effective, tomorrow it will do a lot more.

No. words $\frac{845}{60} \times 60 =$ _____ WPM
No. seconds

COMPREHENSION QUESTIONS

1. Why did Bill "clear" himself? _____
2. What caused the first accident? _____

3. Why didn't Bill bail out? _____
4. What did Bill do on the field two weeks after he left the hospital? _____
5. How did Bill define the test pilot's job? _____

6. For whom was Bill testing the *CF-HTK* before his second accident? _____
7. What caused Bill's second accident? _____

8. How did the doctors take care of Bill after his second accident? _____
9. How does the helicopter serve the jet? _____

10. Name one other use of the helicopter. _____

Comprehension score: _____ Rate: WPM _____

DISCUSSION QUESTIONS

Write your answers on a separate piece of paper.

1. Would you have said what Bill said about his helicopter job if you had been in his place? If not, in what way would you have differed from Bill?
2. What did Bill mean when he said, "We're about even with the Wright brothers"?

CHOOSING YOUR LIFE'S WORK



1.



2.



3.



4.



5.



6.



7.



8.

Which of these kinds of work would you like to do? Write the number of the picture which represents your choice. If none of them represents your choice write "none." _____

Read the selection below to find information that will aid you in choosing your life work. It isn't the kind of selection that you should try to read rapidly. Read slowly and carefully.

1. Preview the boldface and italicized headings.
2. Read the selection carefully. As you do so, think about the order of the steps suggested. Try to understand the instructions fully.
3. Try especially to fix in your mind for recall the people, organizations, and printed materials to which you might turn for help in choosing a vocation. You will be checked on sources of information.

HINTS ON CHOOSING YOUR VOCATION *

Among the 6,500,000 Canadians who work to earn a living, very few are helicopter pilots like Bill Murray. Why did Bill choose this particular vocation? In the first place he was better qualified for piloting than for any other type of highly skilled work. Bill also believed that this particular field had a great future for him. What is even more important he thoroughly enjoyed piloting a helicopter in spite of the many dangerous experiences he had.

JOB AREAS

Twelve Job Classifications. Like Bill, the test pilot, all of us should select a vocation in which we will be very happy and in which there is a good future. Because most of us are not interested in becoming helicopter test pilots, how shall we start in choosing our life's work? This is often not as easy as it seems. There are more than 22,000 different vocations in Canada. To be of help to you all these occupations have been arranged into twelve major classifications. They are:

1. Professional and semiprofessional workers: doctor, engineer, architect

2. Farmers and farm managers
3. Owners and managers, except farm: owner of a business or store
4. Clerical and similar workers: file clerk, secretary, bookkeeper
5. Salesmen and saleswomen: retail salesman, manufacturer's representative
6. Craftsmen, foremen, and similar workers: carpenter, machine operator
7. Domestic-service workers: chambermaid, cook, chauffeur
8. Semiskilled workers of various kinds: packer, crater, packager
9. Service workers, except domestic: barber, waitress, usher
10. Farm laborers and farm foremen
11. Laborers, except farm: unskilled workers
12. Workers in transportation.

MAKING AN INVENTORY OF YOUR QUALITIES

Considering Interests, Abilities, and Personality. In making an intelligent selection from the list above, you need to take an inventory of your own qualities. You should consider your interests, abilities, and personality. It would be extremely unwise to select a vocation for which you are not suited. You also

* Based on material prepared for this book by Edward Kolvenzon.

qualities (kwōl'ī tīz): Those traits which are necessary in doing a certain job.

occupation (ōk'ū pā'shūn): The trade, business, office work, or profession to which one gives most of his time.

professional (prō fēsh'ūn āl): Trained, skilled, expert.

clerical (klēr'ī kāl): Having to do with one who keeps records or accounts or takes charge of correspondence.

counselor (koun'sē lēr): One who advises.

operator (ōp'ēr ā'tēr): A worker, especially one in a mechanical industry.

personality (pūr'sū nāl'ī tī): That which causes one person to be different from another.

inventory (in'ven tō'ri): The act of summing up items in stock, business, or personal qualities.

vocation (vō kā'shūn): Employment in a certain business or profession.

should give some thought to your physical and mental abilities, to your hobbies, and to your ability to express yourself orally and in writing.

Ask yourself such questions as these: Do I like machinery well enough to become a skilled craftsman? Can I afford to continue my education and training after high school so that I can prepare for a vocation in one of the many professions? Do I prefer outdoor work or indoor work? Am I more comfortable in work clothes or do I prefer jacket, shirt, and tie? These are only a few of the many questions which you should have in mind in selecting your vocation.

There is a printed interest inventory which will help you to find out in which group of vocations you are most interested. It is called the *Kuder Interest Inventory*. Your high school counselor will probably give this inventory to you if you ask him for it.

EXPLORING THE FAVORED JOB

After deciding which of the twelve broad vocational classifications is best suited to your interests, you need to decide upon the specific job. You should do a lot of thinking, reading, and talking with others before reaching this decision.

Reading References. In your school there may be a special vocational guidance section in the library. The pamphlets in this section should be of great value to you. Vocational guidance counselors on school staffs have a number of pamphlets that give current information on employment trends, opportunities, and requirements.

ORGANIZING INFORMATION IN OUTLINE FORM

If you should explore all of these sources of information without a plan for organizing it, the results would be confusing. On the other hand, if you have some topics in mind about which to gather information and a plan for taking notes, you can read with a purpose.

It is a very good plan to use an outline in organizing such information while reading from the different sources. With the topics in an outline before you, you can search for information about particular points. When you find

Often your community has printed information. The Kiwanis Clubs and Professional Women's Clubs prepare material about vocations. Libraries may have information.

Some universities give assistance through their guidance branches. The Faculty of Education, University of Toronto, through its branch, publishes several pamphlets on employment opportunities and educational requirements for specific jobs.

Guidance branches and apprenticeship boards of provincial governments help through specially prepared pamphlets that give brief descriptions of each profession and trade together with its educational and other requirements and salary range. The National Employment Bureaus maintained by the federal government in most cities, give considerable help in finding jobs.

People to Be Consulted. There are people who can help you, also. If your school has a vocational guidance counselor be sure and talk with him. Other sources of information are businessmen and workers who are doing the particular kinds of work in which you are interested. Ask them questions about their activities. If possible, visit their places of work.

Mass Media. Radio, television, and motion pictures can provide much information to you. Through these media you can observe musicians, actors, actresses, announcers, athletes, and people in many other fields. Recently the national television network presented a series of eleven programs entitled "Careers." Each program featured a prominent professional with a panel of students and dealt with a specific profession.

information about some one of the points, you can jot it down under the right heading. Then when you have finished with all of your reading, your facts will be organized for you. With an organized outline of facts in front of you, the total "picture" will be clear-cut and meaningful.

Ask your teacher to suggest an outline to use in gathering information about vocations. Then read and take notes using this outline.

ACTIVITY 1—RECALLING SOURCES OF INFORMATION

See how well you can remember sources of information mentioned in this article.

1. Name two sources of information about vocations that you may find in your school.
 - a. _____
 - b. _____
2. What sources of information on vocations might be in your community?
 - a. _____
 - b. _____
 - c. _____
 - d. _____

3. From which government departments might you obtain information on vocations?
 - a. _____
 - b. _____
4. Who are some people you might consult in obtaining information about different kinds of work?
 - a. _____
 - b. _____
 - c. _____

WHY DID BILL HAVE A DIFFICULT JOB?



The story about the helicopter test pilot, Bill Murray, said that he has one of the toughest jobs in aviation—"riding an eggbeater that wants to tip over." Why was the helicopter called an "eggbeater"? How did Bill make the helicopter fly when it had no wings? The selection below will give you the answers to these and other questions about flying a helicopter.

1. Underline the pattern in which you think this selection may be written: (a) classification; (b) problem solving; (c) explaining a process; (d) giving detailed factual information; (e) following directions.
2. Scan the selection as follows:
 - a. Scan to find the question on top of each paragraph. Underline two or three key words in each question as soon as you locate it.
 - b. Scan to find the sentence in each paragraph which best answers the question. Underline

the two or three key words in this sentence.

- c. Do Activity 1 on page 113.
3. Read the entire article carefully:
 - a. Study each paragraph to understand in detail the process named by the key words which you underlined.
 - b. After you have read each paragraph, lift your eyes from the page. Think of the key words you underlined in one of the sentences, then try to explain the process to yourself. If you have trouble, reread the part that you forgot or didn't understand, then try to explain the process to yourself again.

FLYING A HELICOPTER *

Why Is the Helicopter Called an "Eggbeater"? Most of the airplanes we see have wings and are driven through the air by a propeller or by a jet engine. Instead of wings a helicopter has one or more horizontal rotors on top. The long, narrow blades of this rotor spin parallel to the ground when the helicopter is flying. The spinning rotor is responsible for the various names sometimes given the helicopter, such as "eggbeater," "whirlybird," or "flying windmill."

In What Way Is a Helicopter Like an Airplane? In order to understand how the helicopter flies we must recall the principle used in getting an airplane off the ground and through the air. The necessary lift is created by a slight difference in air pressure that develops above and below the wing as it moves through the air. The shape of the wing causes the air to move more rapidly over its upper surface than under the lower surface. As a result of this action there is less pressure downward on the upper surface of the wing

than there is upward on the lower surface. With a large enough area there will be enough force exerted on the wing to lift the plane off the ground. The main rotor blades of a helicopter do the same job as the wings and propeller of an airplane.

How Does the Pilot Make a Helicopter Fly? The blades of a helicopter are not rigid as are the blades on a windmill. It is possible to change the angle at which they "bite" the air. This angle is called the *pitch* of the blades. It is chiefly through controlling this pitch that the pilot makes the helicopter fly. When the pitch is increased, the lift increases; when the pitch is decreased, the lift decreases. The pitch can be set at one point so that there is no lift. This is the situation when a helicopter is standing on the ground with its rotor blades turning rapidly.

How Does the Pilot Get the Helicopter off the Ground? Now let's see how the pilot gets the helicopter off the ground. With the rotor turning rapidly he pulls up on a control called the *collective pitch stick*. This sharp pull increases the pitch of all the

* Based on material prepared for this book by Gordon E. Van Hooft.

parallel (pār'ā lēl): Lying evenly in the same direction.
exert (ĕg zŭrt'): To put forth strength or force.
revolution (rĕv'ō lŭ'shŭn): Motion of any body about a center or axis.

collective (kŏ lĕk'tiv): Tending to collect or gather together.
cyclic (sĭ'klik): Moving in cycles or circles.
neutral (nŭ'trāl): State of disconnection from controls.
descend (dĕ sĕnd'): To lower; to come down.

main rotor blades at once. At the same time more power from the engine is applied to keep the rotor turning at the same speed. With all blades held at the same sharp pitch the helicopter flies straight up. If the pilot pulls up the pitch stick gently, the helicopter rises slowly and smoothly off the ground as the pitch of the blades increases.

How Can a Helicopter Be Made to Fly Forward? Forward flight is harder to explain. The answer is in the ability to vary the pitch of each rotor blade as it makes one revolution. If the pilot wishes to fly forward he pushes forward on a control called a *cyclic pitch stick*. This is a device that causes the blades to have the least pitch when they are passing the forward position and the most pitch when passing the rear position. This action produces more lift when the blade rotates around back than it has when it passes the front. As a result the whole rotor disk tilts forward and the helicopter flies forward through the air. After the disk is tilted the pilot returns the con-

trol to neutral to prevent the helicopter from tipping over.

How Can a Pilot Fly a Helicopter Backward or Sidewise? In a similar manner the pilot can fly backward or sidewise by pulling the cyclic pitch stick backward or moving it to either side. In all cases the pitch of the main rotor blades is changed so that they take the smallest bite of air in the direction that the pilot wishes to fly. Actually, this is not quite as simple as described here but additional explanation would take up too much space.

What Happens If the Engine Stops in Flight? You have seen how a spinning maple seed glides down to earth. If the engine stops, the air flowing through the rotor blades causes a helicopter to descend in the same way as a maple seed. The air flowing upward keeps the rotor blades turning as the helicopter comes down. At the same time it also develops enough lift to allow the helicopter to settle slowly and safely to the ground.

ACTIVITY 1—FINDING HOW MUCH YOU GOT FROM KEY WORDS

Answer briefly each of the questions below. Use the key words you underlined in a very short phrase or sentence for each answer. The first one is answered for you.

- 1. Why is the helicopter called an eggbeater? Because of spinning rotors
- 2. In what way is a helicopter like an airplane? _____
- 3. How does a pilot make a helicopter fly? _____
- 4. How does the pilot get the helicopter off the ground? _____
- 5. How can the helicopter be made to fly forward? _____

ACTIVITY 2—EXPLAINING A PROCESS

- 1. Explain the process of getting a helicopter off the ground. _____
- 2. Explain the process of a helicopter descending to the ground if the engine stops. _____

Perhaps you will choose a vocation in which you make use of formulas. Bill Murray or any other test pilot would be as helpless as a helicopter without a rotor were he not able to use formulas.

Whether or not you choose a vocation in which you use formulas, you are sure to meet many formulas in your work as you pass on through high school. Reading a formula is like translating shorthand or another language. A formula is a "shorthand" method of stating a mathematical rule. First you must read and understand the rule. Then you must be able to read the "shorthand" formula that stands for the rule. Next you must translate the rule by substituting the numbers in the problem you want to solve for letters or other symbols in the formula.

Most of the rules upon which formulas are based were discovered hundreds of years ago. Take for example the formula for finding the circumference or outer rim of a circle. In ancient times people noticed that whenever they measured both the circumference and diameter of a circle the same thing happened. They found the circumference to be $3\frac{1}{2}$ times the diameter. This number kept appearing so often in working with circles that finally someone began using a letter—a Greek letter π , called *pi*—to represent the number $3\frac{1}{2}$. Thus we can see how we happened to have the formula $C = \pi \times d$, or

$C = \pi d$. The diameter is, of course, twice as long as the radius of a circle. So, when using the radius, the formula becomes $C = 2\pi r$ or $C = 2 \times 3\frac{1}{2} \times$ length of radius.

Check this formula by drawing some circles and measuring their circumferences and diameters. For example draw a circle with a diameter of 7 inches. The radius of this circle would of course be $3\frac{1}{2}$ inches. Work out the formula $2 \times 3\frac{1}{2} \times 3\frac{1}{2}$. This will give you 22 inches. Now take a tape measure and measure the circumference of the circle. Did you find it to be 22 inches?

Written as a decimal, the number $3\frac{1}{2}$ becomes 3.14. It is easier to work with the number in this form than in the form of a fraction.

Suppose that an engineer wanted to find the distance that the tip of one of his rotor blades traveled in making a complete revolution. Suppose further that his rotor blade was 15 feet long. This would be the length of the radius of the circle which the rotor would make while in action.

The engineer would substitute 15 feet for r , and 3.14 for π in the circumference formula:

$$C = 2\pi r = 2 \times 3.14 \times 15 = 94.2$$

Thus he finds that the tip of this 15-foot rotor blade travels 94.2 feet in each revolution.

TRANSLATING THE FORMULA FOR FINDING THE CIRCUMFERENCE OF A CIRCLE*

In working with the problems below, write the formula under the word *Formula*. Under *Substitution* write the formula with the numbers substituted for letters. Under *Answer* write the answer after you have computed it on separate paper.

1. What distance does the tip of a rotor blade 26 ft. 9 in. long travel in each complete revolution?

Formula: Substitution: Answer:

2. The radius of a bicycle wheel is 26 inches. How

much ground will the wheel cover in one revolution?

Formula: Substitution: Answer:

3. Mr. Green wanted to place a metal strip around a kitchen table which had a radius of 2 ft. 6 in. How much metal stripping did he have to buy?

Formula: Substitution: Answer:

TRANSLATING THE FORMULA FOR FINDING THE AREA OF A CIRCLE*

Another formula which a helicopter pilot might use is the one for finding the area of a circle.

It has been discovered in years past that the area of a circle equals "pi" (π) times the radius multiplied by itself. When a number is multiplied by itself it is

said to be *squared*. When a number is to be squared this is usually shown by placing a small 2 above it.

So the formula for finding the area of a circle is:

Area of a circle = $\pi \times$ radius multiplied by itself

Write the formula, the substitution, and the answer for each of the problems on the following page.

* Based on material prepared for this book by Francis J. Mueller.

- | | |
|--|--|
| <p>1. Find the area of the “disc” created by a helicopter rotor with a radius of $7\frac{1}{2}$ ft.</p> <p>Formula: Substitution: Answer:</p> | <p>3. Mrs. Jones wanted to cover the top of a round table with oilcloth. The table had a radius of 3 ft. How many square feet of oilcloth would she need to buy?</p> <p>Formula: Substitution: Answer:</p> |
| <p>2. Mr. Stevens dug up sod in his back yard to make a round flower bed which had a radius of 9 ft. How many square feet of sod did he dig up?</p> | |

TRANSLATING THE FORMULA FOR FINDING RATE OF SPEED IN TRAVELLING

- | | | | | | | | | | | | | | | | | | | | |
|---|--|----------|---------------|---------|--|--|--|----------|---------------|---------|--|--|--|----------|---------------|---------|--|--|--|
| <p>If a helicopter made a trip of 19 miles in 8 minutes, what was its rate of speed in miles per minute?</p> <p>You can work problems like the above by a formula, also. The rule is to find the rate and divide the distance by the time. The formula for this rule is: $r = \frac{d}{t}$. Translating this formula into the numbers in the problem, we have: $r = 19 \div 8$; $r = 2.375$. The helicopter travelled at the rate of 2.375 miles per minute.</p> <p>Use the formula $r = \frac{d}{t}$ in working these problems:</p> <p>1. A helicopter climbed an altitude of 1350 feet in 75 seconds. What was its rate in feet per second during this climb?</p> | <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">Formula:</td> <td style="width: 33%;">Substitution:</td> <td style="width: 33%;">Answer:</td> </tr> <tr><td colspan="3"> </td></tr> </table> <p>2. Lindberg flew a distance of 3800 miles in $33\frac{1}{2}$ hours. What was his rate in miles per hour?</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">Formula:</td> <td style="width: 33%;">Substitution:</td> <td style="width: 33%;">Answer:</td> </tr> <tr><td colspan="3"> </td></tr> </table> <p>3. Harry and his family travelled 325 miles in 8.5 hours during an automobile trip. What was their rate in miles per hour?</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">Formula:</td> <td style="width: 33%;">Substitution:</td> <td style="width: 33%;">Answer:</td> </tr> <tr><td colspan="3"> </td></tr> </table> | Formula: | Substitution: | Answer: | | | | Formula: | Substitution: | Answer: | | | | Formula: | Substitution: | Answer: | | | |
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| Formula: | Substitution: | Answer: | | | | | | | | | | | | | | | | | |
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| Formula: | Substitution: | Answer: | | | | | | | | | | | | | | | | | |
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TRANSLATING FORMULAS INTO WORDS

Write the words for which each of the formulas stands.

- | | | | |
|-------------------|---|--|--|
| $A = \pi r^2$ | : | | |
| | | | |
| $r = \frac{d}{t}$ | : | | |
| | | | |
| $C = 2\pi r$ | : | | |
| | | | |

Selecting Formulas

- | | |
|---|---|
| <p>Select the right formula for working each of the problems below. Use the formula in working the problem. Do this without rereading any of the information which has already been given.</p> <p>1. Parcel Post Zone No. 3 covers a circle with a radius of 175 miles. How many square miles are there in this zone?</p> <p>Formula: Substitution: Answer:</p> | <p>2. A round mirror has a radius of 11 inches. How many inches of tape are needed to circle it?</p> <p>Formula: Substitution: Answer:</p> <p>3. A certain “crack” train makes a regular trip of 525 miles in $4\frac{3}{4}$ hours. What is its rate per hour?</p> <p>Formula: Substitution: Answer:</p> |
|---|---|

REMEMBERING DETAILS IN READING FACTUAL MATERIAL

Did you have any trouble in remembering details to answer the questions on page 111? Do you often have trouble in recalling what you read? If so, here are some suggestions which will be helpful to you.

1. "Whip up" some personal interest in the topic.
2. Set a strong purpose for remembering what you want to remember.
3. Read to select and fix in mind the particular items that will serve that purpose.
4. Concentrate fully on these items while reading. Give them your complete attention.
5. When you come to one of the items you want to remember, stop and reflect on it for a moment, associating it with your purpose. Then firmly deposit the fact in your mind to stay.
6. See if you can find some way of relating each new fact to the one before it.
7. When you have finished with a paragraph, see if you can tell yourself what the facts are that you

wanted to remember. If you can't recall some of them, reread these particular ones, and try again.

8. Work with each paragraph in this way. After each successful attempt to recall details in one paragraph, go back to the other paragraphs that you have covered and see if you can still recall the details in them.

9. Repeat this procedure several times at different hours or on different days before you take a test on a detailed chapter, give a report on it, or use it for some other purpose in which recall is necessary.

Use the procedure suggested above (except 9) in recalling the facts in the short selection that follows.

No doubt you already have an interest in this topic without trying to "whip one up." Read for the purpose of making a good score on the test that follows. This test will check you on recall of details. Work with the article as long as you like before taking the test.

Why Can't Teen-Agers Get Jobs?

Provincial laws restrict the employment of youngsters. Children of legal school age are not allowed to work during school hours. Employment of young people in dangerous occupations is forbidden. The employment of children at night is also carefully controlled, and limits are set on the number of hours and days a week they may work. In some provinces it is an offense to employ girls under 18 years of age in a restaurant or hotel without the written consent of a parent or guardian. Supporters of child-labor laws say that laws are needed to protect children from dangerous and unsuitable jobs.

However, provinces do permit children aged 14 or even younger to work in safe and suitable jobs outside of school hours and on nonschool days, but the number of hours is restricted. Also, teen-agers in Canada are fortunate in that the long summer holiday coincides with the period of peak demand for employees.

Figures obtained from a sample population of 35,000 were published by the Dominion Bureau of Statistics in February, 1963. They showed that the 14-19 age group numbered 1,871. Of these 566 were in the labor force, that is, were either employed or seeking employment. Only 87 were unemployed.

Aside from the restrictions of law, four main factors cause unemployment in the teen-ager labor force:

- a. Many available jobs are turned down because they do not carry the desired social status.
- b. Many available jobs require higher educational qualifications than many teen-agers have.
- c. Some businesses withhold jobs from teen-agers

who have less than a grade twelve or a university level of education. They do this, not because of the demands of the jobs, but because of a promotional policy of advancing their employees to executive jobs that do require higher education.

d. Jobs that require grade nine or lower level of education are usually seasonal and leave many teen-agers unemployed several months each year.

It would appear, then, that lack of education is the main reason why teen-agers can't get jobs—that is, jobs that they like and that hold a future for them.

Draw a line under the right answer in each question. Do this from memory.

1. According to the law in some provinces how old must girls be before they are allowed to work in restaurants without the parent's consent.
(a) 21 (b) 12 (c) 18 (d) 16.
2. Limits are set on the amount of time youngsters can work. In what terms are these limits set?
(a) months in a year (b) years in high school
(c) hours and days a week (b) school grades.
3. Out of 566 teen-agers in the labor force in February, 1963, how many found jobs?
(a) 566 (b) 479 (c) 1871 (d) 87.
4. What is the main reason why more teen-agers can't get jobs?
(a) people don't want them (b) parents won't let them work (c) restrictive laws (d) lack of sufficient education for the job sought.

DRAWING CONCLUSIONS

Below you will find several different sets of facts. Study each set carefully. Then see if you can draw a conclusion based on the facts. Write your conclusion on the lines beneath each set of facts.

1. In spite of the high demand, getting to be an engineer is certainly no snap. Planning for the profession must start as early as the first year of high school, while you still have time to acquire a strong background in *mathematics*, *physics*, and *chemistry*.

In times gone by, all that engineers were supposed to study was *science* and *mathematics*. Many engineers who had such training now feel needs for more background. They are in positions in which they need to talk and write fluently. Many of them are doing work closely tied to the government and wish they knew more about the *social sciences*. Quite often engineers become managers, vice-presidents, or presidents in their companies. Then they wish they had taken some courses in *business*.

If you were planning to be an engineer what conclusion would you draw in regard to courses that you should take? Name them. _____

2. A few of the better employment agencies are very helpful in getting part-time jobs for teen-agers. They find out all about a person and try to get a job for him for which he is best suited. Other agencies won't bother with teen-ager jobs at all. Many agencies which do try to find jobs for teen-agers know you only from having talked with you during one brief interview. Of course they also have an application blank which you have filled in, but this may limit your opportunities. If you say on your blank that your only experience in earning money has been mowing lawns, you are apt to be classified as a "laborer," and get a laborer's job. If you say you can type, and there is a need for typists, you may get a typing job when you would prefer something else.

What would be your conclusion in regard to making use of employment agencies in finding a part-time job? _____

3. John Stevens had a good mind and could have made excellent grades in school. But he wouldn't study. He liked machinery and said that he wanted to work in a factory. He thought he wouldn't need any education for factory work, so he just went to school because he had to.

One summer, much to John's delight, he got a part-time job in a factory. He found the machinery that he thought he loved so much to be hot and noisy. The work was very routine and tiresome. At night he was greasy and dirty.

John quit his job in the factory before the summer was half over. After this experience what conclusion do you think John might have reached about his education and his life's work? _____

4. Lord Strathcona was a poor boy who learned to work hard and save at least half of everything he earned. He rose to a high position in the Hudson's Bay Company and was influential in the building of the Canadian Pacific Railway.

Dr. Cora Hind, a newspaper worker for the Winnipeg Free Press for sixty years, was known in many countries for her services to agriculture in western Canada. As a child she followed her grandfather around his farm helping him.

Dr. Frederick Banting saw two men fall from a scaffolding once when he was young. He watched intently as the doctor arrived and tended to the patients. Later, as a doctor, he discovered insulin, receiving the Nobel Prize in 1923.

Judging from these examples, what value do you think early experiences may have with regard to the choice and success of a later career? _____

5. Between 1650 and 1750 over sixty million Europeans died of smallpox. This highly contagious disease was spread by contact with a person suffering from it.

In 1962 the teen-age son of a Brazilian missionary became ill on the train from New York to Toronto. Two days after he was admitted to a hospital his illness was diagnosed as smallpox. Many people had been exposed to the virus. Television, radio, and the newspapers urged possible contacts to be vaccinated.

Judging from what you have read, do you think that there was a smallpox epidemic on this continent in 1962? _____

Why or why not? _____

USING SOURCES OF INFORMATION

You have learned that you can find information in many different sources. You know how to find information in dictionaries and encyclopedias. You know how to locate a book that you need in the library. You have probably used a globe and an atlas. An atlas, of course, is a book of maps.

You know the difference between *science* books, *history* books, and *literature* books. You know that a *biography* is the story of a person's life. By now you probably know how to find things in these books by using the table of contents, the index, the glossary, and the footnotes.

In this unit you learned where you can get several pamphlets on different subjects.

Another reference which you should be using a great deal at your level is *The Reader's Guide to Periodical Literature*. This guide is published monthly and contains references to the latest articles published in most of the magazines. These references are arranged alphabetically by subjects and authors. If you wish to find the very latest information about some topic, then, the *Reader's Guide* is the place to look for it. This is where you would look to find the latest information about rockets.

Answer the questions below to find out how well you know where to look for information old and new and on different topics. Underline the answer to each question.

- Where would you locate information about the most recent developments in the design and construction of *helicopters*?
 - an atlas
 - history books
 - geographies
 - Reader's Guide*
- Where would you look to find a book titled *Helicopters Today and Tomorrow* written by John Wingate?
 - encyclopedia
 - biography of a great man
 - card catalog in a library
 - literature books
- The best place to look to find information about the life of *Louis Pasteur* would be:
 - dictionary
 - history books
 - magazines
 - biography of Louis Pasteur
- If you wished to find a scientific discussion of *antibodies* the best place to look would be:
 - newspapers
 - social studies books
 - science books
 - a dictionary
- Where would you look to find the meaning of *anthrax*?
 - card catalog
 - mathematics books
 - dictionary
 - Reader's Guide*
- If you wanted to find information about the business of running a small fruit farm, where would you look?
 - encyclopedia
 - dictionary
 - Federal Department of Agriculture pamphlets
 - social studies books
- If you wanted more information on the subject of *lighting systems* than you can find in your science textbooks, where would you look?
 - newspapers
 - atlas
 - history books
 - card catalog
- Where would you find a large map of France?
 - dictionary
 - atlas
 - science books
 - a biography of Lafayette
- Where would be the best place to trace the route of a round-the-world trip?
 - atlas
 - encyclopedia
 - globe
 - Reader's Guide*
- Where would be the best place to get information about *coral*?
 - Reader's Guide*
 - encyclopedia
 - social studies books
 - an atlas

COMBINING INFORMATION FROM TWO SOURCES

In order to do a thorough job of finding information on some topic, we need to use more than one reference. In getting ready to make a report or write a paper, it is necessary to explore several sources of information. Then we must combine all of the facts that we get into one report.

Account from an Encyclopedia *

Microscope. A magician revealing fantastic worlds of wonder in a drop of water or a speck of animal tissue—such, indeed, is the microscope; but it is very much more than this.

Ordinary magnifying glasses or simple microscopes—convex lenses used to obtain a magnified view of an object—were apparently known, at least as curiosities, from remote times; but the compound microscope was invented some time between 1590 and 1610. Galileo, the famous astronomer, is one to whom is ascribed the honor of inventing the microscope. Remarkable dis-

coveries in anatomy and biology were made by the use of both forms in the 17th and 18th centuries. For example, the Dutch scientist Van Leeuwenhoek, sometimes known as the “father of microscopy,” showed that weevils, fleas, and other minute creatures are not “spontaneously generated” but come from eggs; and the Italian, Malpighi, was the first to see the capillary circulation of the blood, previously inferred by Harvey. Yet, on the whole, the microscope remained a marvelous toy until comparatively recent times. Now it adds much to human knowledge.

Account from a Science Book **

The First Compound Microscope. It is not definitely known who first mounted two lenses in a tube to make a compound microscope. However, credit for this invention is most often given to Zacharias Jansens of Holland, who experimented with lenses about 1590.

Early Workers with the Microscope. Among the first scientists who made use of the microscope were Anton Van Leeuwenhoek of Holland, and Robert Hooke of England.

Van Leeuwenhoek was the first to consider the

microscope more than a toy. He was the first to learn that there were living things too small to be seen with the human eye without the help of a microscope.

Robert Hooke was the first scientist to use the word *cell*. He published books on cells and improved the microscope.

The Microscope Brought Progress in Medicine. In 1661, Marcello Malpighi, an Italian doctor, used his microscope to show that the blood flows from the arteries to the veins through tiny tubes called *capillaries*.

Combining Information

In reading the two accounts above you found that each one gave some information which the other did not. Both, however, dealt with the same general topics: I. *Date of invention*; II. *Name of inventor*; III. *Early workers and their discoveries*. So these topics can make the “backbone” of an outline to use in combining facts from the two sources.

The information has been combined for you for topic I and the outline for topic II has been started for you. Study the combination of information for topic I carefully. Then do your own combining for topics II and III on separate paper.

In working with the third topic you will find that

the *science* book mentions one worker who isn't mentioned in the encyclopedia. You will find that the encyclopedia gives you more detailed information about the discoveries of one of the workers, and the *science* book gives you more detailed information about the discoveries of another worker. Put all of this together in your outline for topic III.

I. Date of invention

- A. Convex lens, in remote times (encyclopedia)
- B. Sometime between 1590–1610 (encyclopedia)
- C. 1590, date most often given (*science* book)

II. Name of inventor

- A. Inventor not definitely known
 - 1. Possibly Galileo (encyclopedia)
 - 2.

III. Early workers and their discoveries

- A.
- B.
- C.

* “Microscope,” *Compton's Pictured Encyclopedia*, Vol. 9, 1957, p. 290.

** Excerpts from Ames, Maurice U., Arthur O. Baker, and Joseph F. Leahy, *Science in Today's World* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1956), pp. 32–33.

SKIMMING WITH THE USE OF KEY WORDS

If you choose a vocation that calls for college training, the article below will be of interest to you.

In this selection the unimportant words appear along with the key words. Skim this article reading key words only. Skip over the unimportant words just as if they were blank spaces. Sweep your eyes

When to Start Planning. The time to begin thinking seriously about college is when you are in junior high school. The seventh grade, in fact, is none too early. Find out what college is like and, above all, why you think going to college is right for you.

The important thing is to develop interest and drive. Teachers say those are two of the key factors in helping a youngster enter college and do well when he gets there.

By the time you begin the ninth grade, you should have a pretty good idea of what you want to do in life. And you still have time to plan your high school work. So start at once.

Decide on a University. In the tenth and eleventh grades begin thinking about the university you might like to attend. Many students attend a university within their province. You may, however, prefer to go farther away from home. Ask the advice of your teachers and your school guidance counsellor. And visit the library where you can study catalogs of all the Canadian universities and many of those of the larger institutions in the United States.

At the beginning of grade twelve you should be corresponding with the university to which you intend to apply. If you anticipate going to a university or college outside Canada make enquiries early so that you are able to meet the requirements. Read the catalogs carefully since many different types of courses are

over the lines as fast as you can, grasping meanings largely from nouns and verbs.

Time yourself. See if you can skim this selection in 35 seconds. Then answer the questions below the selection.* You will be surprised to find how much information you can get from key words.

offered. University courses are more varied and specialized than those given in schools. You may wish to study a new subject which was not available in high school. But many programs have a sequence of courses and these you should also study carefully.

You Must Have Good Grades. The entrance to all Canadian universities is matriculation. This is based on the results of examinations given by the Departments of Education in each province. Though these examinations are given usually in the last year of high school, they measure knowledge you may have acquired in eighth or ninth grade. So do not wait until your final high school year to work for good marks—that may be too late. As competition for admission to universities intensifies, so does the emphasis on your scholastic record.

Plan Your Courses with Your Teachers in Terms of What You Want to Do. As each faculty of a university has some definite prerequisites, you should plan your sequence of courses in high school carefully. If you expect to go to an engineering school, you must complete the right *science* and *mathematics* courses. But many other arts and science courses also have prerequisites. If you know what you wish to do at university, make sure you take the appropriate courses in high school. Think ahead, plan carefully, and work hard if you wish to do well in both school and college.

Checking Information Gained by Reading Key Words

Answer “Yes” or “No,” according to whether these statements are true or false.

- | | |
|---|---|
| _____ 1. Seventh grade is none too early to begin thinking seriously about college. | _____ 6. Subjects are offered at a university which are not offered in school. |
| _____ 2. Two important things to develop are interest and love of sports. | _____ 7. Knowledge of work done in the ninth and tenth grades may be important for gaining matriculation. |
| _____ 3. You should have a pretty good idea of what you want to do in life by the time you're in ninth grade. | _____ 8. Entrance to university depends upon high school marks. |
| _____ 4. Most students attend a university outside their own province. | _____ 9. It does not matter what courses you take in high school as long as you have good grades. |
| _____ 5. At the end of grade twelve you should start correspondence with the university you wish to attend. | _____ 10. Competition for admission to university is decreasing. |

INCREASING YOUR SCIENCE VOCABULARY

The words below are among those which appear most often in *science* books at your level. You will meet them frequently in your reading both in and out of school.

Probably you know how to pronounce many of

these words already. But study the pronunciation of each one anyhow just to make sure that you know how to pronounce it correctly, and that you know its meaning in *science*. Be sure to think about the word as it is used in *science*.

antenna ăn tến'á	One of the movable organs of sensation on the head of an insect; also, wires used in sending or receiving radio messages.
buoyancy bồ'ô'yăn sỉ	The property of floating on a liquid or in the air.
germinate jừ'mỉ năt	To begin to grow or develop.
glucose glô'kô's	A sugar or sirup.
hemoglobin hề'mô glô'bỉn	The coloring substance of the red blood corpuscles.
legume lễ'gũm	The fruit or seed of such plants as peas or beans; the plant itself.
metamorphic mết'á mô'r'fik	Changed in form; usually applied to rocks which have been altered by intense heat, pressure, and so on.
photosynthesis fô'tô sỉn'thế sỉs	The process by which a plant in the presence of sunlight makes sugar and oxygen from carbon dioxide and water.
planetoid plăn'ết oid	One of many small bodies between Mars and Jupiter.
pollution pồ lữ'shủn	Act of making impure or unclean; impurity.
protoplasm prô'tô plắz'm	The living material of both animals and plant cells.
sanctuary săngk'tủ ễ'rỉ	A place of refuge for birds, game, or other animals.
stratosphere străt'ô sfêr	The upper portion of the atmosphere, about 10 to 50 miles above sea level.
supersonic sủ'pêr sôn'ỉk	Faster than the speed of sound, which is about 738 miles per hour.
thermostat thừ'mô stăt	A device for regulating temperature by opening and closing drafts in a furnace.
velocity về lỗ'sỉ tỉ	Rate of motion; speed.

See if you know the meaning of these words as used in *science*. Write one of the words in each of the blank spaces below.

- Rain helped the seeds to _____.
- Plants are factories. Their process of manufacturing sugar and oxygen is called _____.
- The rocket flew high. It sped clear through the _____.
- While flying between Mars and Jupiter, a rocket could be hit by a _____.
- Rich, red blood has plenty of _____ in it.
- The soap floated on water. It had _____.
- Mrs. Hart was on a diet. She wouldn't eat a _____ vegetable because she thought it would be fattening.
- Mr. Stone put an _____ on his roof to receive radio messages.
- Bill liked sweets. He would eat any kind of _____.
- The citizens of Hicksville were not permitted to dump garbage in the river because it would cause _____ of the water.
- There is a haven in Kingsville, Ontario, where birds may alight and remain unharmed. This is their _____.
- When heat or pressure has changed a rock, it is called a _____ rock.
- The jet plane traveled at a _____ speed.
- John wanted more heat in the living room, so he adjusted the _____.
- As long as a plant or animal is living, it has active _____.
- The airplane travelled with great _____.

UNIT NINE

WISE USE OF COMMUNICATION



This is the last story in the book. You should be able to read it at a very high speed and still enjoy it.

Beginning time: Hr. _____ Min. _____ Sec. _____

SEEING THROUGH A BRICK WALL *

Many old sayings seem to have changed in the last few years. Since Sputnik soared into the air in 1957 the adage, "what goes up must come down" no longer seems so apt. When the first crude television pictures were transmitted by John Logie Baird in a London attic in 1925, he was the first man in the world to see through a brick wall, as it were.

The idea of television was not new. It has been a dream of centuries, but in the twentieth century many of these dreams seem to be coming true. After the invention of the telephone by Bell, the possibility of seeing pictures as well as hearing sounds over a great distance became more feasible. The brains of many scientists worried over the problem for years and countless patient investigators had many heartbreaks before Baird experienced the thrill of watching not a vague shadow but a face having expression and light and shade. But Baird met with ill-health, discouragement and poverty before he was successful.

John Baird was born at Helensburgh in Scotland, the son of a church minister. Even as a schoolboy he showed signs of inventive genius. When telephones

were still fairly rare, he rigged a telephone transmitter by his bedside so that he could communicate with four of his friends. While still at school, Baird bought and pushed home an antiquated car. Not only did he make this work, but he invented ways of starting the engine without cranking the handle for a long time. True to his Scottish upbringing, he found ways of economizing on gas.

On leaving school he went for a short time to a technical college and Glasgow University and later served as an apprentice in an automobile factory. He left this position to take up a post in an electric power company. Because of ill health he was unable to join the army in World War I, and was forced to resign from the electric company.

This enforced leisure enabled him to devote more time to working on ideas connected with television. At one time he invented a patent sock which kept the feet warm and dry in any weather. Money began to flow from the sale of these socks, but again he was forced to sell the business because of illness. Later he sold honey, and at another time coconut dust as a fertilizer. He was a versatile genius but he had to abandon a business career completely on the advice of his doctors.

* Adapted from T. C. Bridges and H. H. Tiltman. *Master Minds of Modern Science*. London: Harrap & Co., 1934 p. 23.

adage (ad'ij): a wise saying that has been much used, a well known proverb.

apt (apt): suitable, fitting.

bull's eye lens: shaped like half a sphere to concentrate light.

crude (krüd): unrefined, lacking finish.

feasible (fē'zə bəl): probable, practicable, capable of being carried out easily.

half a crown: a British coin, worth a little more than a quarter.
inventive (in ven'tiv): good at inventing.

patent (pat'ənt) or (pā'tənt): a government grant to a person by which he is the only one allowed to make or sell a new invention for a certain number of years.

versatile (vē'r'sə tīl) or (vē'r'sə təl): able to do many things well.

Henceforth he devoted all his time to struggling with the unsolved problems of television. Others including Jenkins in the United States were working on similar problems. But Baird did not have an easy time. Money was so short that sometimes he found it difficult to buy food. His first successful experiment was achieved with an apparatus made from an old tea chest and an empty cookie box. The projection lens was a bull's-eye lens costing about a dime, while the driving mechanism was a toy electric motor. Eventually friends provided funds and he was able to continue his work.

The dramatic moment of success cannot be better described than in the inventor's own words.

It was on an October afternoon in 1925 that I experienced the one great thrill which research work has brought me. After weeks of steady progress, on this particular afternoon the dummy's head which I used for experimental purposes showed upon the receiving screen not as a black and white effect, but as a real image, with details, and with gradation of shading. I was vastly excited and ran downstairs to obtain a living object.

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>	
Ending time:	_____	_____	_____	No. words $\frac{740}{\quad} \times 60 = \text{_____WPM}$
Beginning time:	_____	_____	_____	No. seconds _____
Total time:	_____			

Compare your speed in reading this story with your speed in reading "A Spear for Omar," pages 18-19. Now check your understanding and appreciation of the story, for gain in speed alone is useless.

COMPREHENSION QUESTIONS

- What was Baird's nationality? _____
- Give two ways in which Baird showed inventiveness when still a boy.
a. _____
b. _____
- Give three examples to show the versatility of Baird's inventions.
a. _____
b. _____
c. _____
- Of what did the apparatus which Baird used in his first successful experiment consist? _____

- Why was the apparatus so crude? _____

The first person to appear was the office boy from the office below, a youth named William Taynton, and he rather reluctantly consented to submit himself to the experiment.

I placed him before the transmitter, and went to the next room to see what would appear on the receiving screen. The screen was entirely blank, and no effort of tuning would produce any results. Puzzled and very disappointed, I went back to the transmitter, and there the cause of the failure became at once evident. The boy, scared by the intensely bright light, had backed a yard or so away from the transmitter. I gave him half a crown, and persuaded him that there was no danger, whereupon he took up his position again before the apparatus. This time his head appeared on the receiving screen quite clearly. It is curious to consider that the first person in the world to be televised should have required a bribe to accept the invitation.

Even after this success, much remained to be done. Many English and American inventors worked for years before television as we know it today was achieved. The rewards for television appearances are even greater today.

- Who was the first person to appear on television? _____
- Describe why the screen remained black in the experiment? _____
- Explain in your own words what is meant by the final paragraph. _____

DISCUSSION QUESTIONS

Write your answer on a separate piece of paper.

- Why does Baird think it curious that the boy had to be bribed?
- What besides ill-health delayed Baird's experiments with television?
- Why has the meaning of some phrases changed?
- Suggest one other phrase, the meaning of which has changed because of scientific development.

MAKING THE MOST OF TELEVISION

In the story that you just read television helped to meet a serious problem. Wise use was made of television. It is to the advantage of all of us to make wise use of all types of communication—not just television, but radio, movies, newspapers, and magazines as well.

The selection below gives you information which will help you make wise use of communication. It also includes some opinions.

1. Read the selection for the purpose of getting main ideas and the clusters of details that go with them.

2. Think critically about what you read as you go along. In order to do the Activities on page 125, you will need to think very carefully about some of the statements in the selection.

3. When you read for details and do critical thinking you cannot cover as many words per minute as in some other kinds of reading. You can learn, however, to hurry along even in this kind of reading. Keep a record of your speed in doing detailed, critical reading of this selection.

Beginning time: Hr. ____ Min. ____ Sec. ____

WISE USE OF COMMUNICATION *

Freedom of communication is necessary in a democracy. People who are free to say and write what they believe cannot be controlled by a dictator. In each era of Canadian history there have been leaders who believed that men's minds must be free if we were to have a real democracy.

An incident in the life of William Lyon Mackenzie is significant. He objected strenuously to the rule of the Family Compact, the governing clique, and he attacked them bitterly in his paper, the *Colonial Advocate*. On June 8, 1826, a number of young men connected with the clique raided his printing office in York, destroying his presses. The matter, however, was brought before the courts, and Mackenzie was awarded substantial damages. The people of Upper Canada were delighted with the outcome of the event and Mackenzie became their popular hero. He continued to speak and write according to his convictions.

The newspapers and magazines today enjoy the same freedom of communication. They can print the news as they see it and express their thoughts on any subject. No pressures from private individuals or groups ought to keep an editor from expressing his convictions.

In the early 1920's Canadians became aware of the communicative possibilities of radio. Pressures from many individuals and groups forced the government to consider ways of protecting the airwaves from individuals seeking control of them for personal reasons. Political party broadcasts and controversial topics of the day were particularly hard to administer to the satisfaction of the majority of Canadians. The government, therefore, set up a publicly owned and controlled Canadian Broadcasting Corporation, composed of men appointed by the federal government and directly responsible to them. These men have worked

clique (klēk): A small, exclusive group of people.
scrutinizing (skrū'tə nīz ing): Inspecting carefully, examining closely.
diversified (di vers'i fid'): Varied; different; essentially different.

hard to provide the best services in radio and television to all people. They control all radio and television broadcasts, scrutinizing each one on behalf of the Canadian people. Every effort is made to give national coverage to all parts of Canada so even the most isolated regions can receive the communications. Program content is balanced to satisfy the diversified interests of Canadians. The time allotted to foreign programs is regulated so Canadian talent can be protected and developed. As it is costly to produce Canadian programs some imported commercially sponsored network programs from other countries have been used. To strike a balance between the production of Canadian programs and the use of those from other countries has been a challenge to the Canadian Broadcasting Corporation.

The people of Canada realize that all kinds of free-

	Hr.	Min.	Sec.
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____
Total time:	_____		

dom bring responsibilities as well as privileges. This is particularly true of the freedom of communication. To have the right to say and write what we think requires that we tell the truth, and that we are fair to all groups and all individuals.

It is extremely important to examine all types of communication with great care. This is especially true of television because its programs are often viewed by the entire family. It can bring every sin, every murder, into our living room if we let it. It can convince listeners to buy things which they cannot afford and do not need.

On the other hand the possibility for television to do good is great. If you and other Canadians watch worthwhile programs, it is likely that more of them will be produced. Let us learn to make wise use of communications.

No. words 540 × 60 = _____ WPM
 No. seconds _____

Comprehension score: _____ Rate: WPM _____

Critical Thinking About Reading

The activities below give you an opportunity to do critical thinking about parts of the selection which you just read. The answers to these activities are not stated in the text of the article. They call for meanings which you can obtain only by *thinking* and *reasoning* about statements made in the article.

ACTIVITY 1—TESTING A CONCLUSION

The selection you have just read says that the Canadian Broadcasting Corporation is set up to protect the freedom of communication of the Canadian people.

How would you go about the task of collecting facts to prove that this conclusion is true or untrue?

ACTIVITY 2—DECIDING ON THE SIGNIFICANCE OF FACTS

The selection states that the related incident in the life of William Lyon Mackenzie is significant. Do you agree?

_____ Why?

ACTIVITY 3—RECOGNIZING DIFFERENT POINTS OF VIEW

Many people would disagree with a comment which implied that business firms use their advertising budgets to

spread political propaganda. These people feel that, on the contrary, advertisers use the influence of their budgets mainly to avoid being drawn into controversy. The following true incident suggests the reason.

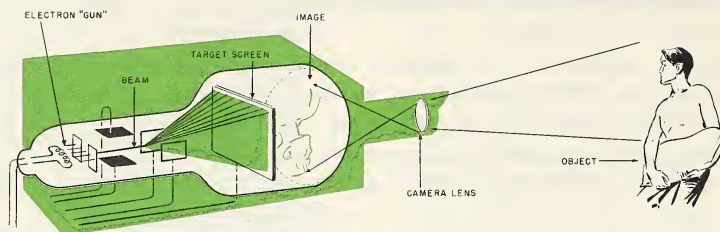
A few years ago, an advertiser in a major American city sponsored a television program that showed old movies. One of the films chosen for the advertiser by the station was a biography of a religious leader. As the evening of the broadcast approached, the advertiser was flooded with protests. Many people sincerely believed that the film put a favorable light on what was to them the very greatest of the sins. They said that they would never again buy the sponsor's product if he permitted the film to be shown. Hearing of the protests, the people who admired the subject of the biography wrote to say that they would never again buy the sponsor's product if he didn't show the film.

If you were the advertiser, what would you do?

- a. Insist that the station either show a different program or lose your business.
- b. Let the program proceed as planned, but add a statement on freedom of communication.
- c. Show the movie, but announce that it will be followed by movies about other religions.

Write your answer on separate paper. Tell which choice you would make, and why. You may choose and justify an entirely different course, if you like.

THE MAGIC OF TELEVISION



The Orthicon Tube

Tom marveled at the magic of television. Indeed, television seems almost like magic to all of us. But there really is no magic about it. Television is based on scientific principles which are easily understood. The selection below explains how television works.

Can you identify the pattern of *science* writing used in this selection before you read it? In answering the question underline one of these types: (1) classification, (2) problem-solving, (3) biography, (4) factual detail, (5) describing a process.

Having identified the pattern, how will you read the selection? (1) Fast? (2) Moderately fast? (3) Slowly? (4) Very slowly?

What will be your first step in reading the selection? Underline one phrase: (1) Finding main ideas. (2) Previewing headings and diagram. (3) Studying the body of the article.

In studying the selection what are you going to concentrate upon doing? Underline one phrase: (1) Find classes of some subject and note their likenesses and differences. (2) Look for the solution to problems. (3) Find and try to understand steps in processes. (4) Find and grasp clusters of details about main ideas.

Now that you have identified the pattern and decided how to study it, go ahead with your reading.

HOW TELEVISION WORKS *

The major steps in producing a television broadcast are to take the pictures and to record the sounds. Both of these processes will be described.

TAKING THE PICTURES

The pictures are taken with a special television camera. The images are made by recording light and dark dots. When you examine a picture in a newspaper with a magnifying glass, you see that it is made up of thousands of tiny dots, in different patterns of light and dark. Television pictures are made in the same way, except that the light and dark dots are converted into varying strengths of electricity.

The orthicon tube in the television camera contains

* Based on material prepared for this book by Irving Zeichner.

the parts of the camera which change the light and dark dots into electric impulses. In the diagram above you notice a target screen in the front part of the tube and an electron "gun" in the back part.

First the lens in front of the orthicon tube is focused on an object. Next the picture is formed on the broad face of the tube within the camera. The electron "gun" then shoots out a steady stream of tiny particles of electricity, or electrons, toward the face of the tube. This thin beam of electrons is not aimed at one spot but moves back and forth across the screen. It starts at the top and works down to the bottom in the same way that your eyes follow the type on this printed page. As it moves, it paints the picture in dots.

As the electrons hit a light spot on the picture, many electrons bounce back. As they strike a dark spot, very few bounce back. This results in a stream of

image (im'ij): A likeness; a reproduction.

convert (kōn vūrt'): To change; to turn.

orthicon (ōr'thī kōn') *tube*: A tube in a television camera which contains important parts needed in taking television pictures.

focus (fō'kūs): To adjust the eye or a lens to distinct vision.

translate (trāns lāt'): To change in form or expression.

transmit (trāns mīt'): To send or transfer from one place to another.

impulse (im'pūls): Motion produced by a sudden force.

amplify (ām'plī fī): To enlarge in amount or size.

antenna (ān tēn'ā): Wires of a radio or television station or set which send waves into space or receive them.

reverse (rē vūrs'): To turn back.

microphone (mī'krō fōn): An instrument for transmitting sound waves.

electronic (ē lēk'trōn'ik): Having to do with electrons.

electrons which becomes stronger or weaker depending upon whether the particular dot being scanned is dark or light. Now, you see, the dots making up the picture have been translated into varying strengths of electricity.

TRANSMITTING AND RECEIVING

The amplified electrical impulses are now sent out into the air by means of a tall antenna at the broadcasting station. Waves of electricity travel through the atmosphere and may be caught by the antenna in your home if your set is "tuned" to the proper channel. Now, the problem for your receiver is to change the varying electrical impulses back to spots of light and dark which will make up the picture on your screen. How is this done?

The picture tube in your television set acts like the orthicon tube in the camera, only in reverse. A signal from the television station is received. The picture tube sends out a beam of electrons which sweep over a fluorescent screen in the picture tube. It produces just one tiny dot at a time. This dot sweeps over the screen at exactly the same speed and in exactly the same pattern as those of the sending beam. The beam changes in strength, too, glowing more brightly when it is more intense. Thus the electrical impulses are

changed back again to a pattern of light and dark spots. These spots appear so rapidly that they are blended into the complete picture which we see.

RECORDING, TRANSMITTING, AND RECEIVING SOUND

Sound is recorded at the same time the pictures are taken. A microphone is set up to catch the sound waves. In the studio these sound waves are changed into an electric current that varies in strength as the sound waves vary. When broadcast they are converted into radio waves and are sent along with the picture.

A complex electronic system in your receiver captures these waves, amplifies them, and changes them back to sound waves which your ear can interpret.

COLOR TELEVISION

In color television the camera has to do the work of three ordinary television cameras. Such a camera separates the rays of light into three colors—red, green, and blue. An image in red, one in green, and one in blue is translated into three different electrical signals. Then the three signals are added together to make a fourth signal. If a three-color tube is placed in a television set, it blends the three color signals into one true full-color picture.

ACTIVITY 1—WRITING STEPS IN PROCESSES

Write the steps in taking a television picture:

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____
- 7. _____

Write the steps by which your television set changes the electrical impulses back to pictures which you can see:

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____

"READING" ANGLES

From scene to screen, television involves an uncountable number of angles. Although experience has probably given each of us a general notion of what an angle is, it is in the study of geometry that we treat angles formally and fully.

Recognizing each of several different kinds of angles when you see them is like recognizing the symbol *boy* for boy, and the symbol *girl* for girl. On this page you will have practice in recognizing and reading angles.

WHAT IS AN ANGLE? *

Study the explanation that follows.

After reading each sentence, stop to think about it and make sure that you understand it. If a sentence discusses something shown in a diagram, be sure to find it.

In geometry we learn that an angle is one of the simplest of figures, that it consists of two straight lines

called *sides*, which meet at a point called the *vertex*.

Angles are usually identified by letters. Thus the angle shown in Figure 1 would be identified as $\angle A$.

An angle may be thought of as the rotation of a line about a point. Thus, the size of an angle depends entirely upon the amount of rotation and not at all upon the length of its side.

CLASSIFYING ANGLES

Here you have a classification article similar to the classification selections which you have in *science*. Read to find out how each angle is different from the others.

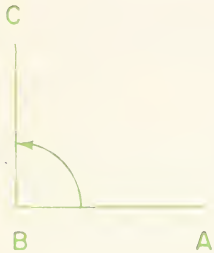
Angles may be classified by their amount of rotation:

An angle formed by a quarter rotation, as in Figure 1, is called a *right angle*.

An angle formed by less than a quarter rotation in Figure 2, is called an *acute angle*.

An angle formed by a half rotation, as in Figure 3, is called a *straight angle*. The sides meet to form one line.

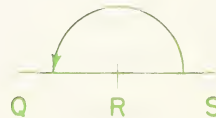
An angle formed by a rotation greater than a quarter rotation but less than a half rotation, as in Figure 4, is called an *obtuse angle*.



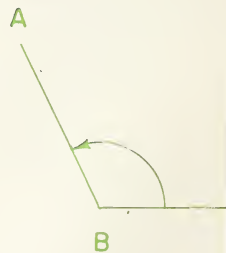
1.



2.



3.



4.

"READING" ANGLES

Identify each kind of angle shown below. On the line opposite each figure write *acute*, *right*, *obtuse*, or *straight*, according to the kind of angle represented by

1. _____
2. _____
3. _____
4. _____

the figure. Use the corner of a card to help you determine whether or not an angle is a right angle. You refer to the diagrams above.

5. _____
6. _____
7. _____
8. _____

* Based on problems prepared for this book by Francis J. Mueller.

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Date Due

EDUC JUL 12 '74			
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JUN 13 RETURN			
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JUL 12 '74			
JUN 22 RETURN			
APR 22 RETURN			
DUE EDUC SEP 9 '77			
Returned AUG 31 '77			
Returned OCT 31 '77			
DUE EDUC SEP 6 '83			
AUG 31 '83			

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